Lewis & Clark County (Cont'd)	Scratchgravel	Franklin	PA # 25-339
	Stemple	NE NW S13	PA # 25-197
		Swansea Tailings	PA # 25-208
		SE SW S10	PA # 25-212
		Pangewasset	PA # 25-226
		Astor	PA # 25-227
Lincoln County	Libby	Snowshoe	PA # 27-005
		Cherry Creek Millsite	PA # 27-006
		Mitchell Creek	PA # 27-055
		Silver Cable	PA # 27-066

LEWIS AND CLARK (CONT'D)

SCRATCHGRAVEL

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: FRANKLIN **PA#:** 25-339

Date: August 31, 1993 **Time:** 1220

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer
Pierson, TD&H

Visitors: John Fay, Caretaker

Weather/Seasonality Observations: Warm; sunny; breezy (10 mph); cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #10: WR-1 and shaft; #11: WR-2 (foreground) and WR-5 (background); #12: Leach Pond #3 (foreground) and WR-3 (background); #13: Leach Pond #2; #14,#15: TP-1; #16: Tailings and WR-4; #17: Mill foundation and loadout; #18,#19: Leach Pond #1. Video Tape No. 6

General Comments/Observations (not covered specifically in attached Inventory Forms): Site was reached by truck through a locked gate; caretaker has the key.

Other Hazardous Materials/Substances Present: Pile of copper sulfate or oxide present on the concrete mill foundation.

General Comments on Potential Remedial Alternatives: Waste rock piles have sulfides, treat/cover and revegetate; Leach ponds are 20% vegetated (mostly knapweed), revegetate; Tailings are unvegetated with low pH, treat and revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): FRANKLIN PA#: 25-339

Legal Description: T 10N ;R 4W ;Sec. 11 , SE1/4 NW1/4 ___1/4

County: LEWIS & CLARK Mining District: SCRATCHGRAVEL

Latitude: N 46° 38' 22" Longitude: W 112° 04' 25"

Primary Drainage Basin and Code: Tenmile Creek/10030101
Secondary Drainage Basin: Tenmile Creek

USGS Quadrangle map name(s): Scratchgravel Hills

Mine Type/Commodities: Hardrock/Silver, Copper, Gold, Lead

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): James Salisbury, The Thomas Cruse Mining & Dev., 704 Parkview, Missoula, MT 59803. (406) 542-2676.

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? MDSL has placed grates over two shafts; waste rock has been pushed into another shaft.

General site features: Elevation 3900'-3980' , Slope 5° ,
Aspect Gentle grassy pasture land; northeast facing

Land use: Mining X , Recreational___, Residential X , Urban___,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 1.8 acres.
Dimensions: Most of site is vegetated; dimensions are 1,570 feet x 1,500 feet.

Predominant vegetation types: Grasses, sage

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites).

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 97 well logs with a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Classified as contact-metamorphic deposits and veins that have been filled open fractures and, locally, replaced more or less of the wall rock.

Mining/milling history, ore type/tenor, host rock, gangue: Mine operated from 1870 to 1919, then closed and allowed to fill with water. The mill ran was operated in the 1950's with very little processing and in the 1960's and 1970's was a cyanide leach operation. Deposit is gold and silver in quartz veins; veins carry lead, gold, silver, with some copper. The vein was oxidized and sulfides appear below. Host rock is quartz monzonite (granite) and hornstone.

Mine Operation?
Shafts - Yes X , No ___, # 4 , Comment
Adits - Yes X , No ___, # 3 , Comment
Pits - Yes ___, No X , # ___, Comment
Placers - Yes ___, No X , # ___, Comment
Other - Yes X , No ___, # 2 , Comment Leach pads

Mill Operation? Yes X , No ___. If yes answer the next three questions:

Period(s) of Operation: 1950's, floatation mill; 1960's, cyanide leach operation.

Origin of Ore Milled - Custom Mill ___ Dedicated Mill X ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? 1950s, floatation with a small amount of tailings; 1960s, CN leach with two heap leach pads/ponds.

Montana Bureau of Mines and Geology
Water Well Log Data

11/12/1993

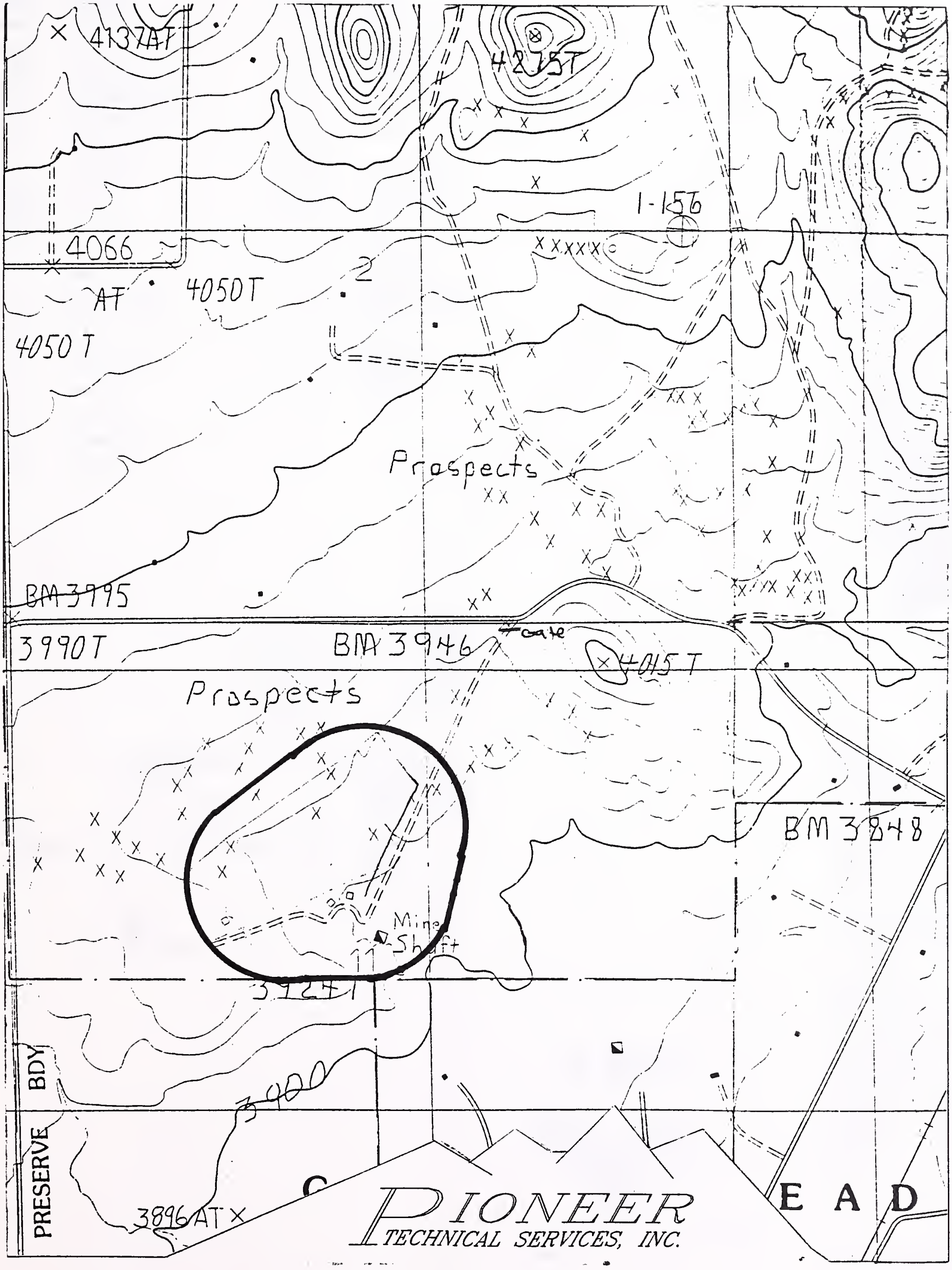
l No.	Location	Depth	Yield	Static Water Level
M:127879	09N 04W 01 BC	200.0	15.0	25.00
M:58900	09N 04W 02	145.0	30.0	65.00
M:58899	09N 04W 02	208.0	6.0	25.00
M:128024	09N 04W 02 DD	310.0	15.0	100.00
M:58901	09N 04W 03	90.0	7.0	33.00
M:58902	09N 04W 03 CD	79.0	20.0	30.00
M:58908	09N 04W 10	46.0	30.0	0.00
M:58911	09N 04W 10	50.0	0.0	0.00
M:58906	09N 04W 10	95.0	12.0	79.00
M:58912	09N 04W 10	40.0	30.0	0.00
M:58909	09N 04W 10	38.0	8.0	0.00
M:58910	09N 04W 10	80.0	10.0	15.00
M:58907	09N 04W 10	44.0	10.0	22.00
M:130188	09N 04W 10 CC	305.0	20.0	180.00
M:58913	09N 04W 10 CCB	105.0	30.0	16.00
M:58915	09N 04W 10 D	43.0	8.0	17.00
M:58914	09N 04W 10 D	38.0	8.0	0.00
M:131264	09N 04W 10 DAD	101.0	12.0	34.00
M:58916	09N 04W 10 DD	140.0	15.0	40.00
M:58917	09N 04W 11	187.0	10.0	28.00
M:58923	09N 04W 11	124.0	10.0	64.00
M:58921	09N 04W 11	88.0	9.0	50.00
M:58919	09N 04W 11	35.0	12.0	27.00
58920	09N 04W 11	0.0	0.0	0.00
58922	09N 04W 11	146.0	9.0	20.00
M:58918	09N 04W 11	64.0	0.0	20.00
M:58924	09N 04W 11 AA	0.0	0.0	30.00
M:58925	09N 04W 11 C	105.0	5.0	25.00
M:58926	09N 04W 11 CC	46.0	20.0	12.00
M:5496	09N 04W 11 CCC	0.0	0.0	0.00
M:58927	09N 04W 11 CCC	30.0	10.0	15.00
M:58929	09N 04W 11 CCC	30.0	10.0	10.00
M:58928	09N 04W 11 CCC	30.0	10.0	10.00
M:5495	09N 04W 11 CCC	0.0	0.0	0.00
M:58930	09N 04W 11 CCD	98.0	15.0	30.00
M:58932	09N 04W 11 D	160.0	20.0	40.00
M:58931	09N 04W 11 D	185.0	9.0	71.00
M:58933	09N 04W 11 DA	185.0	6.0	38.00
M:58934	09N 04W 11 DC	180.0	6.0	48.00
M:58935	09N 04W 11 DCA	148.0	15.0	16.00
M:58936	09N 04W 11 DD	249.0	25.0	53.00
M:58938	09N 04W 12	95.0	20.0	7.00
M:58937	09N 04W 12	102.0	10.0	15.00
M:58939	09N 04W 12	115.0	10.0	57.00
M:58941	09N 04W 12	56.0	30.0	12.00
M:58942	09N 04W 12 BA	45.0	10.0	6.00
M:120004	09N 04W 12 BAA	200.0	10.0	28.00
M:58943	09N 04W 12 BC	240.0	30.0	100.00
M:58944	09N 04W 12 BDD	80.0	20.0	18.00
M:58945	09N 04W 12 C	124.0	8.0	25.00
M:58947	09N 04W 12 CB	85.0	4.0	15.00
M:58946	09N 04W 12 CB	140.0	8.0	20.00
M:58948	09N 04W 12 CC	336.0	15.0	77.00
M:58949	09N 04W 12 CCCC	30.0	5.0	15.00
M:58950	09N 04W 12 D	87.0	12.0	37.00

M:58940	09N 04W 12 DA	125.0	20.0	13.00
M:62325	09N 04W 12 DB	135.0	50.0	15.00
M:121011	09N 04W 12 DC	148.0	20.0	20.00

Montana Bureau of Mines and Geology
Water Well Log Data

11/12/1993

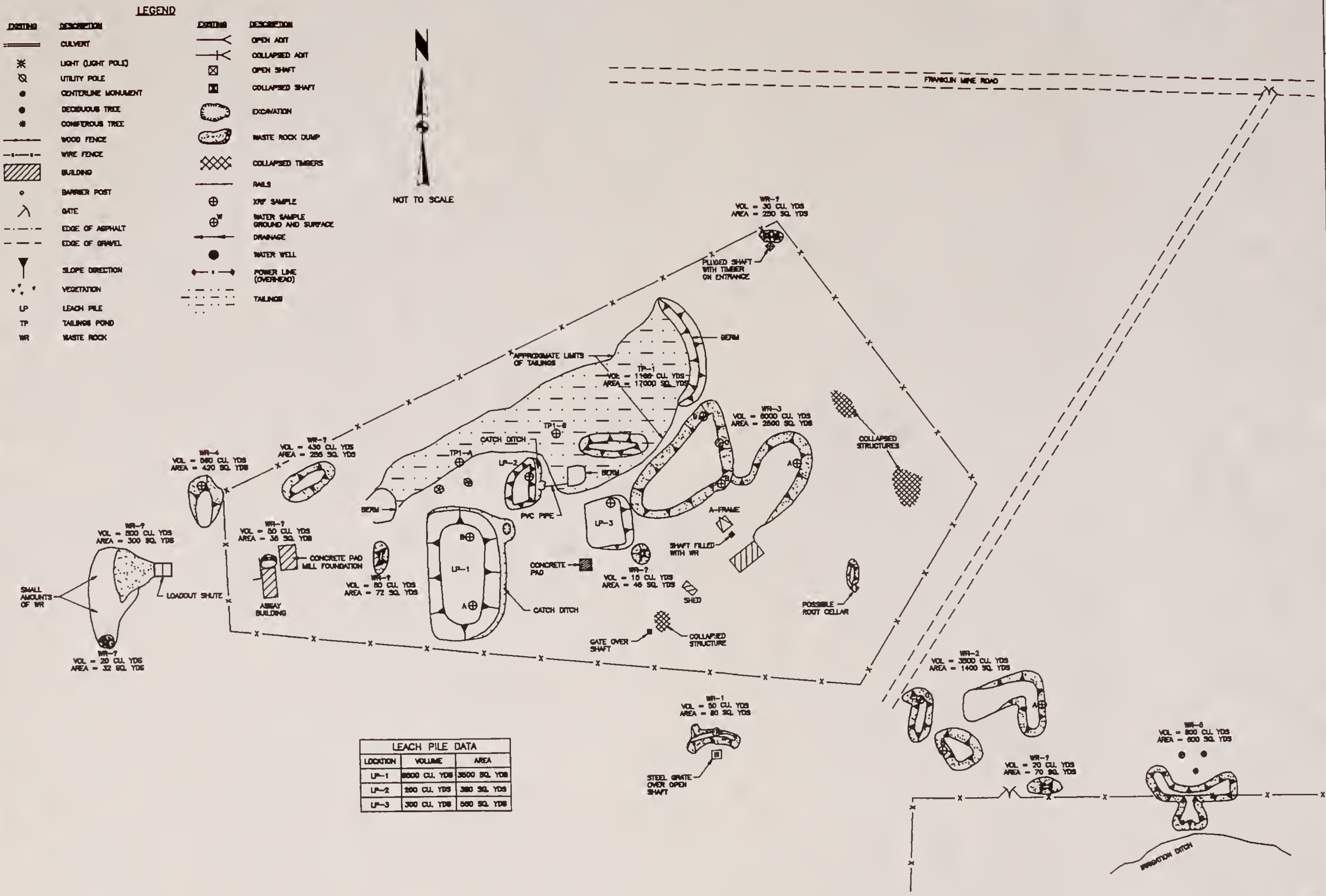
ll No.	Location	Depth	Yield	Static Water Level
M:58951	09N 04W 12 DDB	259.0	6.0	28.00
M:58952	09N 04W 13 A	250.0	3.0	31.00
M:122660	09N 04W 13 BBB	202.0	15.0	90.00
M:58953	09N 04W 13 BBBB	30.0	5.0	15.00
M:58954	09N 04W 14	62.0	0.0	27.00
M:58955	09N 04W 14 A	105.0	10.0	32.00
M:58956	09N 04W 14 AAAA	75.0	5.0	25.00
M:58958	09N 04W 14 B	35.0	0.0	0.00
M:58957	09N 04W 14 B	0.0	0.0	60.00
M:122358	09N 04W 14 DAA	80.0	3.0	27.00
M:58959	09N 04W 15	50.0	4.0	27.00
M:58962	09N 04W 15	340.0	8.0	75.00
M:58961	09N 04W 15	207.0	15.0	70.00
M:58963	09N 04W 15	36.0	10.0	16.00
M:58964	09N 04W 15	230.0	0.0	60.00
M:58960	09N 04W 15	25.0	0.0	0.00
M:58966	09N 04W 15 A	71.0	3.0	30.00
M:58965	09N 04W 15 A	45.0	5.0	30.00
M:58967	09N 04W 15 A	80.0	6.0	30.00
M:58970	09N 04W 15 AA	187.0	12.0	30.00
M:58969	09N 04W 15 AA	32.0	30.0	20.00
M:58971	09N 04W 15 AA	180.0	16.0	52.00
M:120412	09N 04W 15 AA	320.0	8.0	40.00
:58968	09N 04W 15 AA	47.0	0.0	24.00
58972	09N 04W 15 AAA	29.0	25.0	22.00
M:58973	09N 04W 15 AAAB	14.0	5.0	0.00
M:58974	09N 04W 15 AAAB	38.0	10.0	0.00
M:5497	09N 04W 15 AAC	48.0	0.0	0.00
M:58975	09N 04W 15 AADB	32.0	5.0	0.00
M:58976	09N 04W 15 AADB	32.0	4.0	0.00
M:58977	09N 04W 15 AB	140.0	5.0	30.00
M:58978	09N 04W 15 AC	255.0	18.0	63.00
M:58979	09N 04W 15 AD	78.0	6.0	55.00
M:58980	09N 04W 15 BA	139.0	2.0	60.00
M:58981	09N 04W 15 BB	19.0	10.0	1.00
M:58982	09N 04W 15 BC	305.0	14.0	55.00
M:58983	09N 04W 15 C	142.0	0.0	85.00
M:58984	09N 04W 15 DD	36.0	10.0	16.00
M:58985	09N 04W 15 DD	29.0	25.0	16.00



PIONEER
TECHNICAL SERVICES, INC.

FRANKLIN, P.A. NO. 25-339

T10N, R04W, SECTION 11
SCALE: 1" = 1000'


LEGEND
EXISTING
DESCRIPTION
CULVERT
LIGHT (LIGHT POLE)
UTILITY POLE
CENTERLINE MONUMENT
DECIDUOUS TREE
CONIFEROUS TREE
WOOD FENCE
WIRE FENCE
BUILDING
BARRIER POST
GATE
EDGE OF ASPHALT
EDGE OF GRAVEL
SLOPE DIRECTION
VEGETATION
LP LEACH PILE
TP TAILINGS POND
WR WASTE ROCK
OPEN ADIT
COLLAPSED ADIT
OPEN SHAFT
COLLAPSED SHAFT
EXCAVATION
WASTE ROCK DUMP
COLLAPSED TIMBERS
RAILS
XRF SAMPLE
WATER SAMPLE GROUND AND SURFACE
DRAINAGE
WATER WELL
POWER LINE (OVERHEAD)
TAILINGS
N
NOT TO SCALE
FRANKLIN MINE ROAD
WR-? VOL = 30 CU. YDS AREA = 250 SQ. YDS
PLUGED SHAFT WITH TIMBER ON ENTRANCE
BERM
APPROXIMATE LIMITS OF TAILINGS
TP-1 VOL = 1160 CU. YDS AREA = 17000 SQ. YDS
WR-3 VOL = 6000 CU. YDS AREA = 2500 SQ. YDS
COLLAPSED STRUCTURES
WR-? VOL = 430 CU. YDS AREA = 256 SQ. YDS
WR-4 VOL = 560 CU. YDS AREA = 420 SQ. YDS
TP1-B
CATCH DITCH
TP1-A
LP-2
BERM
BERM
PVC PIPE
LP-3
A-FRAME
SHAFT FILLED WITH WR
WR-? VOL = 500 CU. YDS AREA = 300 SQ. YDS
WR-? VOL = 50 CU. YDS AREA = 35 SQ. YDS
CONCRETE PAD MILL FOUNDATION
SMALL AMOUNTS OF WR
LOADOUT SHUTE
ASSAY BUILDING
WR-? VOL = 80 CU. YDS AREA = 72 SQ. YDS
LP-1
CONCRETE PAD
WR-? VOL = 15 CU. YDS AREA = 46 SQ. YDS
SHED
CATCH DITCH
POSSIBLE ROOT CELLAR
GATE OVER SHAFT
COLLAPSED STRUCTURE
WR-? VOL = 20 CU. YDS AREA = 32 SQ. YDS
WR-2 VOL = 3500 CU. YDS AREA = 1400 SQ. YDS
WR-1 VOL = 50 CU. YDS AREA = 80 SQ. YDS
STEEL GRATE OVER OPEN SHAFT
WR-6 VOL = 800 CU. YDS AREA = 600 SQ. YDS
WR-? VOL = 20 CU. YDS AREA = 70 SQ. YDS
IRRIGATION DITCH

LEACH PILE DATA		
LOCATION	VOLUME	AREA
LP-1	8600 CU. YDS	3500 SQ. YDS
LP-2	200 CU. YDS	380 SQ. YDS
LP-3	300 CU. YDS	560 SQ. YDS

DRAWN MWC DATE 10/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

PIONEER TECHNICAL SERVICES INC. BUTTE, MT.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY
FRANKLIN PA# 25-339
SCRATCHGRAVEL DIST. LEWIS AND CLARK COUNTY

SHEET NO.

25-339.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Primarily sand sizes.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Tailings are not impounded; run out over ground, maximum depth is 2.5 feet. Homogenous; no stratification.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): There is a small dam downgradient that is in good condition.

Comments on potential for mitigation: Tailings are spread out thinly; they could easily be mixed and revegetated.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Flammang

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1	WR	50	SE side of fence, due N of grated Shaft #1	None	< 3.5 (D)	0.04	25-339-WR-1	09/01/93 1650	T-Metals, ABA
WR-2A	WR	3,500	SE end of property by power pole, E side of dump	None	4.7 (D)	0.04	25-339-WR-2	09/01/93 1700	T-Metals, ABA
WR-2B	WR		6 feet from WR-2A next to drum on W side	None	4.3 (D)	0.05			
WR-2C	WR		Western pile on W side approx. 1/2 way down	None	< 3.5 (D)	0.05			
WR-3A	WR	6,000	East side of WR-3, NW of sheet metal building	None	< 3.5 (D)	0.045			
WR-3B	WR		South side of WR-3, NW of tar paper building	None	5.8 (D)	0.04			
WR-3C	WR		SE side of dump	None	4.8 (D)	0.04			
WR-3D	WR		N side of dump, S of standing water on tailings	None	< 3.5 (D)	0.045			
WR-4	WR	560	N of loadout on N end of pile	None	5.7 (D)	0.05	N/A	N/A	XRF Analysis
WR-5	WR	800	Far E of site on the SW corner above the irrigation ditch	None	5.8 (D)	0.05			
LP-1A	OTH	9,500	Leach Pad #1, east end	None	6.4 (D)	0.06	25-339-LP-1	08/31/93 1945	T-Metals, ABA
LP-1B	OTH		Leach Pad #1, west end	None	6.6 (D)	0.06			
LP-2	OTH	200	Leach Pad #2	None	6.2 (D)	0.06			
LP-3	OTH	300	Leach pond	None	5.8 (D)	0.02	25-339-LP-3	08/31/93 1900	CN, ABA
TP-1A	TAIL	1,100	Center of pile; 0'-2.5 '	Dam	< 3.5 (D)	0.02	25-339-TP-1	08/31/93 1930	T-Metals, ABA
TP-1B	TAIL		North end of pile; 0'-2'	Dam	< 3.5 (D)	0.03			
SS-1	BKGRND	N/A	Background soil on ridge SE of WR-1 and SW of WR-2C	N/A	N/A	N/A	25-339-SS-1	08/31/93 1805	T-Metals, ABA

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: There was another unsampled waste rock pile with a total volume of 1,075 yd3. 25-339-WR-1 is composite of WR-1, and WR-3A through -3D. 25-339-WR-2 is composite of WR-2A through -2C, and WR-5. 25-339-LP-1 is composite of LP-1A and -1B, and LP-2. 25-339-TP-1 is composite of TP-1A and -1B. 25-339-LP-3 is a grab of LP-3.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X , Number:____ Identification:______________

Filled shafts: Yes X , No___, Number:_____ Identification: Shaft #1; grate over shaft did not allow for sampling (approx. 60 feet deep).

Seeps/Springs: Yes___, No X , Number:____ Identification:______________

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 853

Distance to nearest well used for drinking? 750 feet south of WR-5

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable X , Possible____, Unlikely____.
Water in extensive mine workings probably dissolved metals, etc.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______________________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______________________________

____

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X , Name(s):________________

Dry streambeds: Yes____, No X , Name(s):________________

Other surface water: Yes X , No___, Name(s)/Description: Irrigation ditch on southeast edge of WR-5 (far from other sources).

Waste materials within any floodplain: Yes____, No X Source ID(s):_

Approximate Flood frequency?___1 yr,___10 yr,___100 yr

Estimated seasonal flow of stream(s) (cfs)? N/A
High Flow:___________, Average Flow:_____________

Distance between waste source(s) and nearest surface water body (ft)? Approx. 4 feet of well vegetated ground between the irrigation ditch and the base of WR-5. Most of the site is very distant from surface water.

Surface water draining onto or through waste sources: Yes____, No X ,
Describe: Runoff only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Irrigation ditch at far southeast corner of site is used for irrigation.

Observed erosional/sedimentation/stream turbidity problems? Yes_____,
No X , Distance downstream (ft)?________ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):__________

SURFACE WATER INVENTORY FORM

SAMPLERS: ______________________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______________________________

____

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO_3)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approx. 50 acres

Wetlands present: Yes X, No ___, Describe: Small wetlands (5'x5') just west of toe of WR-5 associated with irrigation ditch; otherwise, very dry.

Carbonate rocks/soils: Yes X, No ___, Describe: Limestone on WR-1.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ___; 10-30 ___; 30-100 ___; 100-300 ___; 300-1,000 ___; 1,000-3,000 ___; 3,000-10,000 ___; 10,000 or greater X; Comments ___

Nearest residence(ft or miles)? Approx. 750 feet south of WR-5.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Flammang

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	SO3	Dry	720	720	Yes	Low, hardpack
WR-2	SO3	Dry	12,600	12,475	Yes	Low, hardpack
WR-3	SO3; pH	Dry	22,500	20,250	Yes	Low, hardpack
WR-4	None	Dry	3,780	3,590	No	None
WR-5	None	Dry	5,400	3,240	Yes	Low, hardpack
LP-1	Sulfides; FEOX	Dry	31,500	25,200	No	Low, large rocks
LP-2	Sulfides; FEOX	Dry	3,240	2,590	No	Low, large rocks
LP-3	None	Dry	4,950	4,950	Yes	Moderate, old tailings
TP-1	pH	Dry	153,000	137,700	Yes	Moderate
Other WR	(Not characterized)	Dry	9,500	9,500	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_, Describe:____

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater_X_; Comments____

Evidence of recreational use on site: Yes_X_, No___, Describe: Bullet holes in buildings; pop cans; motorbike riders reported by caretaker.

Accessibility - Fences, warning signs, closed roads? 2-strand barb wire around the center of site; 3-strand barb wire around main site with a locked gate.

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment____
Wilderness Area - Yes___, No_X_, Comment____
T&E Species Habitat - Yes_X_, No___, Comment Peregrine Falcon
Bat Habitat - Yes___, No_X_, Comment____

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium___, Low_X_
Wetlands Frontage - High___, Medium___, Low_X_
Fisheries Habitat and Species Classification - _4_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_1_, types and locations: Some caving of the filled shaft at WR-3 is beginning to occur.

Hazardous structures: Yes_X_, No___, Number_5_, types and locations: Log opening to collapsed shaft in northeast corner of inner fenced area; headframe over filled shaft; cabin and shed on WR-3; cement walls (approx. 8 feet high) on loadout above mill.

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations: Some settlement on filled shaft.

Unstable waste piles, impoundments, undercut banks: Yes_X_, No____, Number_X_, types and locations: Steep banks on WR-2A and on WR-3.

Fire and/or Explosion hazards: Yes_X_, No___, Explain: Wood structures

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Franklin mine, Prepared by Chen-Northern, May 5, 1989.

USGS, Greater Helena Mining Region, Montana, Scratchgravel Hills and Grass Valley, Bulletin No. 842, pp. 41-43.

USGS, Topographic Map, Scratchgravel Hills, Montana, 7 1/2 minute Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

FRANKLIN
PA NO. 25-339

Franklin Mine PA# 25-339
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 8/31/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-339-LP-1	12.2	75.6	3.00	8.5	3.39	142	25800	0.164	1360	7.8	502	< 6.15	372	0.366
25-339-LP-3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.666
25-339-TP-1	71.7	33	5.22	5.86	7.11	199	17500	0.079	617	5.35	1250	< 6.19	832	NR
25-339-WR-1	223	29.6	4.10	4.79	2.91	1190	37200	0.612	689	5.61	6170	22.6	314	NR
25-339-WR-2	13.8	78.4	0.74	6.35	2.64	128	22500	0.257	968	3.31	358	< 5.11	117	NR
BACKGROUND	27.1	165	1.32	13.6	17.9	29.7	23300	0.071	672	17.9	36.3	< 6.98	76.4	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	TOTAL SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	PYRITIC SULFUR ACID BASE POTENT. t/1000t
25-339-LP-1	0.45	14.1	22	7.92	0.04	0.05	0.36	1.56	20.4
25-339-LP-3	0.2	6.25	119	112	0.08	0.04	0.08	1.25	117
25-339-TP-1	0.29	9.06	7.03	-2	0.15	0.03	0.11	0.94	6.09
25-339-WR-1	4.6	144	-5.5	-149	2.23	1.4	0.97	43.7	-49.2
25-339-WR-2	1.18	36.9	2.95	-34	0.64	<0.01	0.56	0	2.95

LEGEND

LP1 - Composite of subsamples LP1A, 1B, and 2.
LP3 - Sample of LP3.
WR1 - Composite of the subsamples WR1 and 3A through 3D.
WR2 - Composite of subsamples 2A through 2C and 5.
BACKGROUND - On ridge SE of waste rock dump 1 and SW of WR2C.
TP1 - Composite of subsamples TP1A and 1B.

XRF ANALYSIS RESULTS

FRANKLIN
PA NO. 25-339

MDSL AMRB/PIONEER 4/9/93

Mine Name: Franklin PA# 25-339
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25-339-LP1-A			25222.3	2220.29		2711.14	53494.3		160.446 *	605.783		807.444
25-339-LP1-B			13847.3	2194.58		3636.39	52237.1		126.096 *	359.012		690.402
25-339-LP-1-COMP			14111.4	1738.05		3938.47	51990.9		236.009	393.68		691.649
25-339-LP-2			13986.8	1267.08		3193.81	49072.3		275.643	306.623		676.807
25-339-LP-3			110145	1158.79		8039.93	21492.2		435.413	3282.11		909.615
25-339-TP1-A		25931.5	6103.47	1542.57		718.979 *	23264		217.482	747.677		241.32
25-339-TP1-B			7624.3	1430.55		1369.98	20617.7		210.587	879.322		390.389
25-339-TP-1-COMP			6300.11	1726.16		781.956 *	22628.8		262.347	777.676		262.685
25-339-WR1-A			6459.8	1517.26		1002.83 *	41177.1		875.177	232.261		186.255
25-339-WR2-A			14145.9	1525.39		1432.17	60856.4		259.716	376.161		692.485
25-339-WR2-B			19334.4	1690.87		4392.23	51514.2		63.7114 *	137.787 *		955.693
25-339-WR2-C			21207.7	1953.6		3458.26	48166.5		359.885	212.074		673.957
25-339-WR3-A			14824.8	1453.04		1588.59	54121.4		2117.03	388.509		293.844
25-339-WR3-B			26466.1	2661.22		2115.82	39544.4		59.7363 *	110.168 *		1074.54
25-339-WR3-C			23213.9	2629.89		1302.14	47792		708.471	254.203		404.201
25-339-WR3-D			11320.9	1671.34		610.507 *	58839		1992.2	619.165		448.989
25-339-WR-1-COMP	298.945 *		13974.1	2017.97		1370.97	49297.3	420.408 *	1446.17	411.502		374.939
25-339-WR-2-COMP	316.988 *		5990.52	899.035		1206.25	18741.5	234.061 *	1621.16	475.233		187.602
25-339-WR-4			15014.8	2804.55		2485.89	43544.9		223.985	349.057		824.802
25-339-WR-5			15655.6	738.491		517.953 *	56092.2		228.372	149.712 *		357.968

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25-339-LP1-A	175.007		26.3957	261.645	105.489			1035.46			13.3956 *
25-339-LP1-B	159.759		26.1338	353.747	113.056			971.724			9.59403 *
25-339-LP-1-COMP	159.56		20.7661	419.049	100.11			936.861			13.6761 *
25-339-LP-2	134.183		13.1241 *	566.391	104.809			893.022			
25-339-LP-3	157.472			240.465	70.5435			869.408			14.3191 *
25-339-TP1-A	156.887		8.95469 *	1208.28	177.541			398.506		12.8641 *	18.2962 *
25-339-TP1-B	167.6		15.6567 *	740.854	140.914			535.196			11.6179 *
25-339-TP-1-COMP	164.721		10.5079 *	1152.67	167.948			425.359			17.3302 *
25-339-WR1-A	214.099		83.197	5291.61	131.158		79.8887 *	426.121	101.011 *		27.147 *
25-339-WR2-A	139.072		67.0134	1025.31	120.956			1070.38			12.3663 *
25-339-WR2-B	168.198		38.3926	59.5615 *	72.6557			897.39			6.72058 *
25-339-WR2-C	139.455		19.4216	101.673	95.2289			825.296			15.8139 *
25-339-WR3-A	115.808			3123.03	90.555			400.356	159.91 *		
25-339-WR3-B	167.627			81.4996	81.3508			1479.81			7.01917 *
25-339-WR3-C	124.108			3064.36	96.906			812.881	162.817 *		
25-339-WR3-D	124.513			7413.76	109.576		121.623 *	646.137	324.687 *		18.5819 *
25-339-WR-1-COMP	141.086		23.7859	3931.3	116.453		93.986 *	583.643	174.979 *		
25-339-WR-2-COMP	83.1992		7.77256 *	1257.64	185.87			1060.25			15.4035 *
25-339-WR-4	190.889		10.1554 *	451.389	98.814			793.1			13.8601 *
25-339-WR-5	136.934		77.9595	719.337	132.414			771.27			7.97315 *

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

FRANKLIN
PA NO. 25-339

AIMSS SCORESHEET

SITE NAME: FRANKLIN
PA NUMBER: 25-339

GROUNDWATER PATHWAY

LINE NO.				
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	21.794
6	GW - TARGETS	WELLS - 1 MI. x 2.5		242.5
7		WELLS - 1 TO 4 MI		756
8		NEAREST WELL		10
9		TARGETS SCORE	LINES 6 + 7 + 8	1008.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	4395850

SURFACE WATER PATHWAY

LINE NO.				
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		10
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	200
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	200
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	24.004
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		0
19		FISHERY		1
20		RECREATION		0
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	8
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	38406

AIR PATHWAY

LINE NO.				
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		15
26B		DISTANCE TO POPULATION		20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	300
27		LIKELIHOOD SCORE	LINES 25 + 26C	300
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.800
29	AIR - TARGETS	POPULATION - 4 MILES		10000
30		NEAREST RESIDENCE		10
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	10015
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	2403600

DIRECT CONTACT PATHWAY

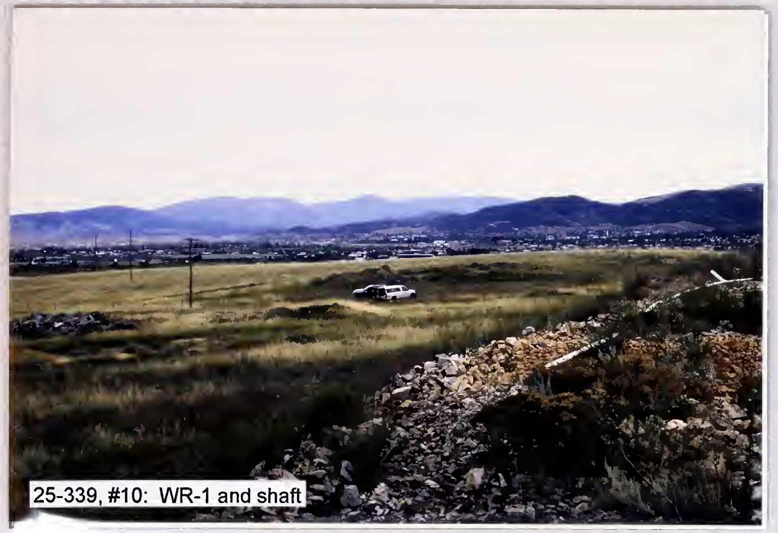
LINE NO.				
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		50
37A		ACCESSIBILITY		10
37B		DISTANCE TO POPULATION		20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	250
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.727
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10000
41		NEAREST RESIDENCE		10
42		RECREATIONAL USE		10
43		TARGETS SCORE	SUM LINES 40 THRU 42	10020
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	1821135

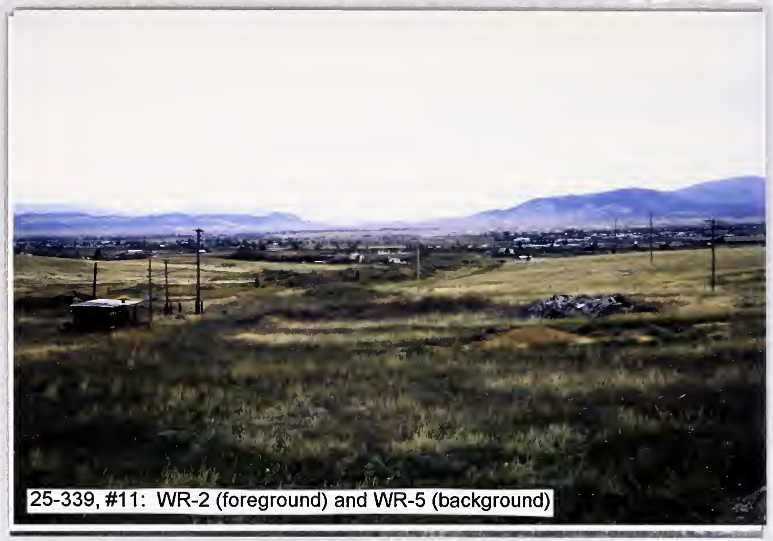
LINE NO.		
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000	**86.59**

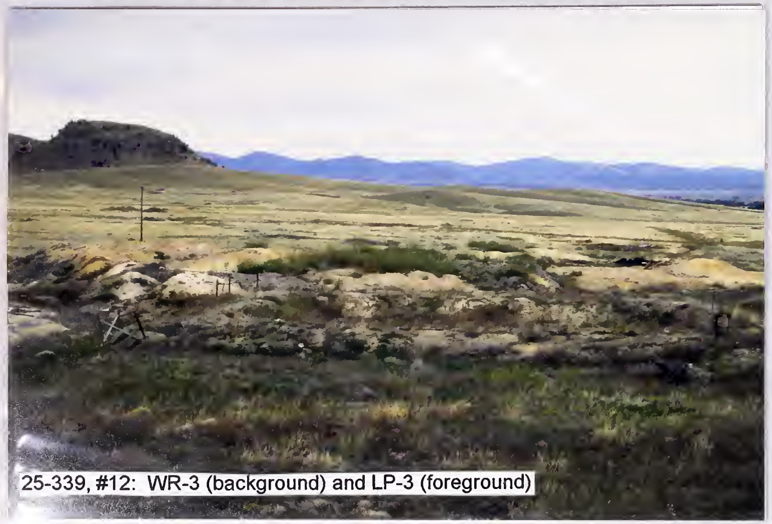
SITE NAME: FRANKLIN
PA NUMBER: 25-339

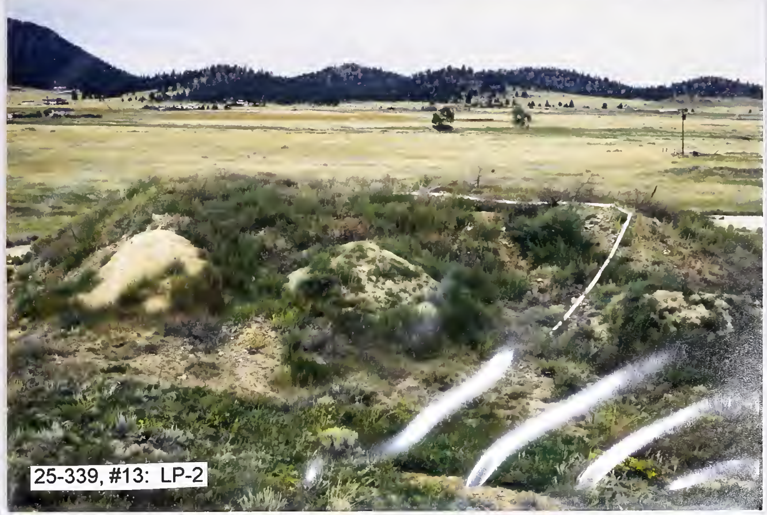
SITE SAFETY

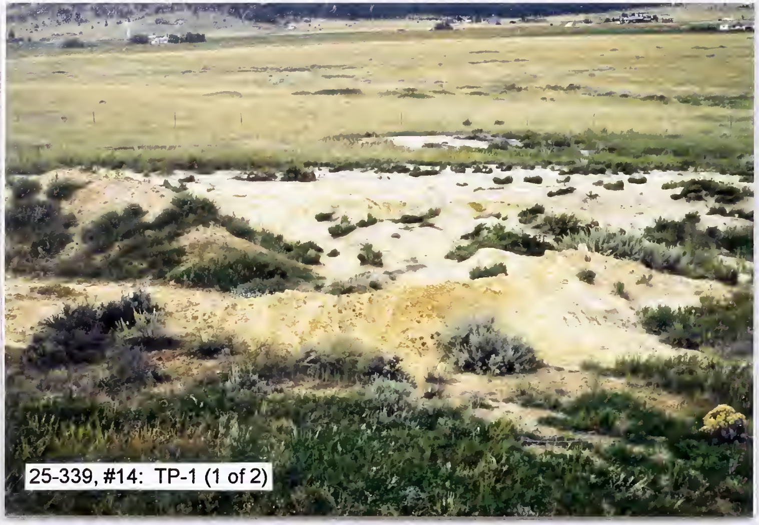
LINE NO.				
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	100
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	200
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	300
9		POPULATION - 1 MILE		10000
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	10020
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**30060.00**

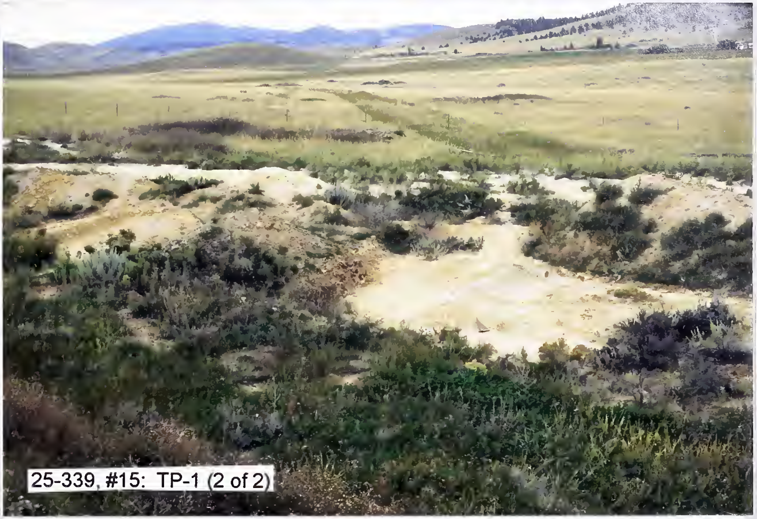

25-339, #10: WR-1 and shaft

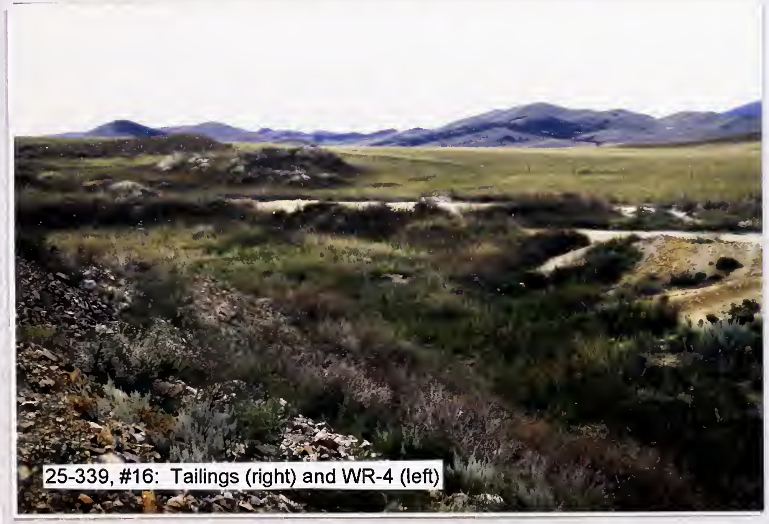

25-339, #11: WR-2 (foreground) and WR-5 (background)

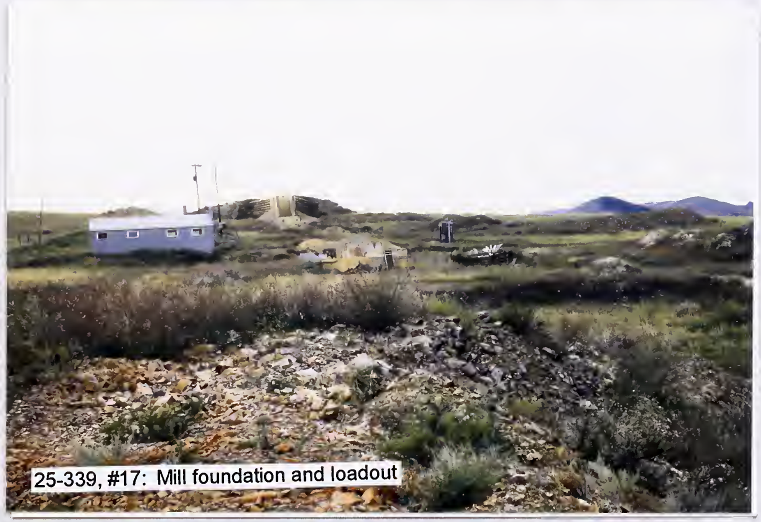

25-339, #12: WR-3 (background) and LP-3 (foreground)

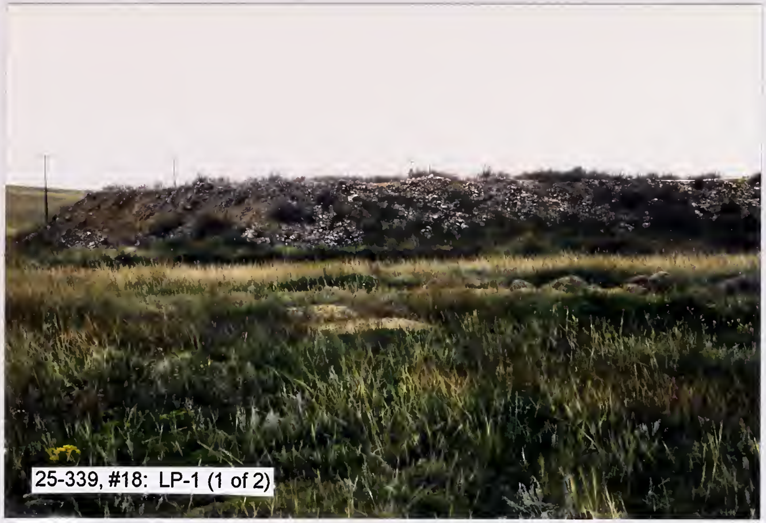

25-339, #13: LP-2

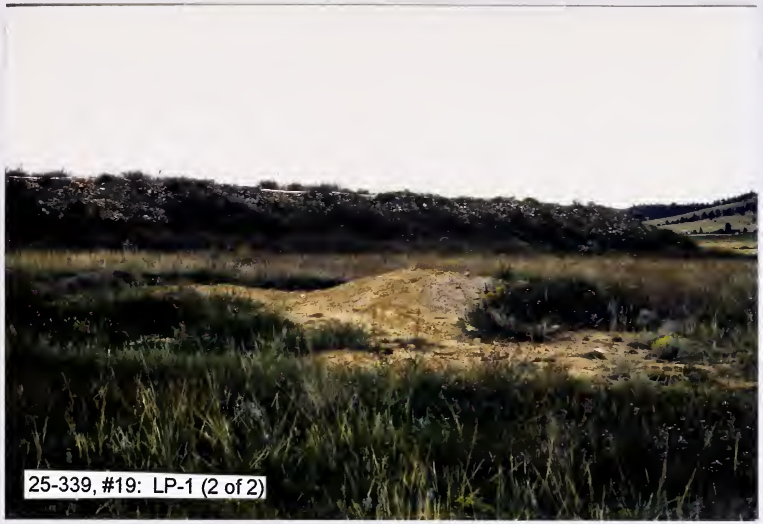

25-339, #14: TP-1 (1 of 2)


25-339, #15: TP-1 (2 of 2)


25-339, #16: Tailings (right) and WR-4 (left)


25-339, #17: Mill foundation and loadout


25-339, #18: LP-1 (1 of 2)


25-339, #19: LP-1 (2 of 2)

STEMPLE

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: NE NW S13 **PA#:** 25-197

Date: August 30, 1993 **Time:** 0915

Field Team Leader: M. Babits, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: None

Weather/Seasonality Observations: Foggy to clear; cool to warm (50°-65°F); no breeze; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #12: Tailings impoundment; #13: TP-1A; #14: TP-1B. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Berm tailings away from creek and recontour and revegetate. Adit discharge (SW-1) is neutral pH.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): NE NW S13 PA#: 25-197

Legal Description: T 13N ;R 7W ;Sec. 13 , NE1/4 NW1/4 ___1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 53' 33" Longitude: W 112° 26' 08"

Primary Drainage Basin and Code: Virginia Creek/10030101
Secondary Drainage Basin: Fool Hen Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Millsite/Unknown

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N___; private/public? Public
Owner, Agent, or Contact(Include address and phone when available): Helena National Forest.

Relationship to other mines/sites in the area/district: Numerous mines are in the area.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 5500', Slope 20°,
Aspect Northeast

Land use: Mining X , Recreational___, Residential___, Urban___,
Agricultural X , Other(Specify)___

Area of disturbed/unvegetated lands? 4 acres.
Dimensions:___

Predominant vegetation types: Douglas fir, marsh grasses, aspens

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites).___

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 3 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Fool Hen Creek flows east to west through the site. Headwaters of Fool Hen Creek are at adit discharge and a dry intermittent stream. Fool Hen Creek flows into Virginia Creek 1,000 feet northeast of the site.

Mining/milling history, ore type/tenor, host rock, gangue: No information is available.

Mine Operation?

Shafts - Yes___, No X , # ___, Comment___

Adits - Yes X , No___, # 1 , Comment Open in culvert

Pits - Yes___, No X , # ___, Comment___

Placers - Yes___, No X , # ___, Comment___

Other - Yes___, No X , # ___, Comment___

Mill Operation? Yes X , No___. If yes answer the next three questions:

Period(s) of Operation: Unknown

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

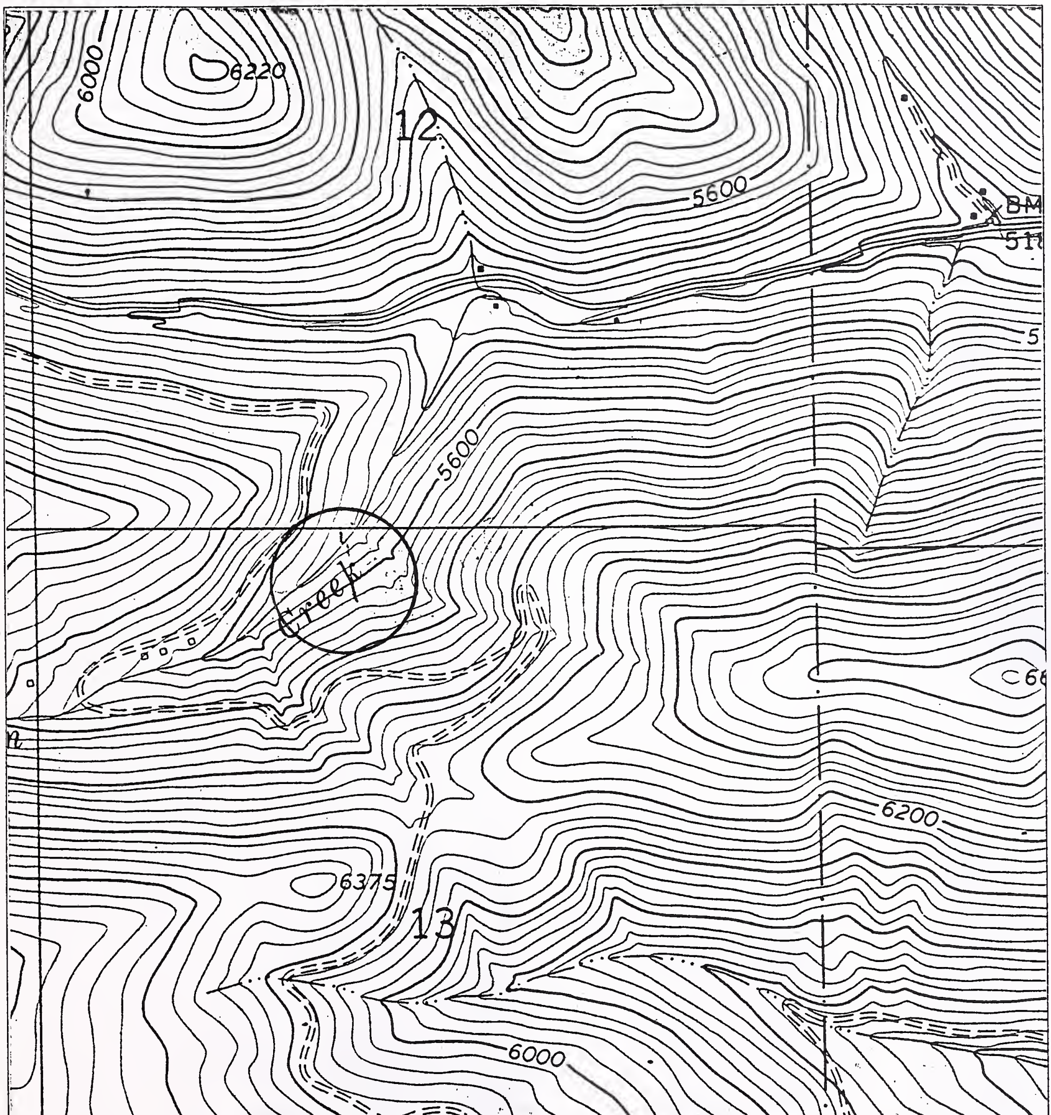
Process? Hg-amalgam, CN$^-$ leach (vat, heap), floatation, smelting? CN-

Montana Bureau of Mines and Geology 06/10/1993
Water Well Log Data

Well No.: M:67645
Location: 13N 07W 11 DA
Site Name: VENDER FRED # 2
County: Lewis & Clark
Depth: 4.0
Yield: 10.0
Static Water Level: 3.00
Pumping Water Level: 0.0
Year drilled: 1961
Driller:
Driller's License:
DNRC Well No.:

Well No.: M:67644
Location: 13N 07W 11 DA
Site Name: VENDER FRED # 1
County: Lewis & Clark
Depth: 6.0
Yield: 10.0
Static Water Level: 3.00
Pumping Water Level: 0.0
Year drilled: 1961
Driller:
Driller's License:
DNRC Well No.:

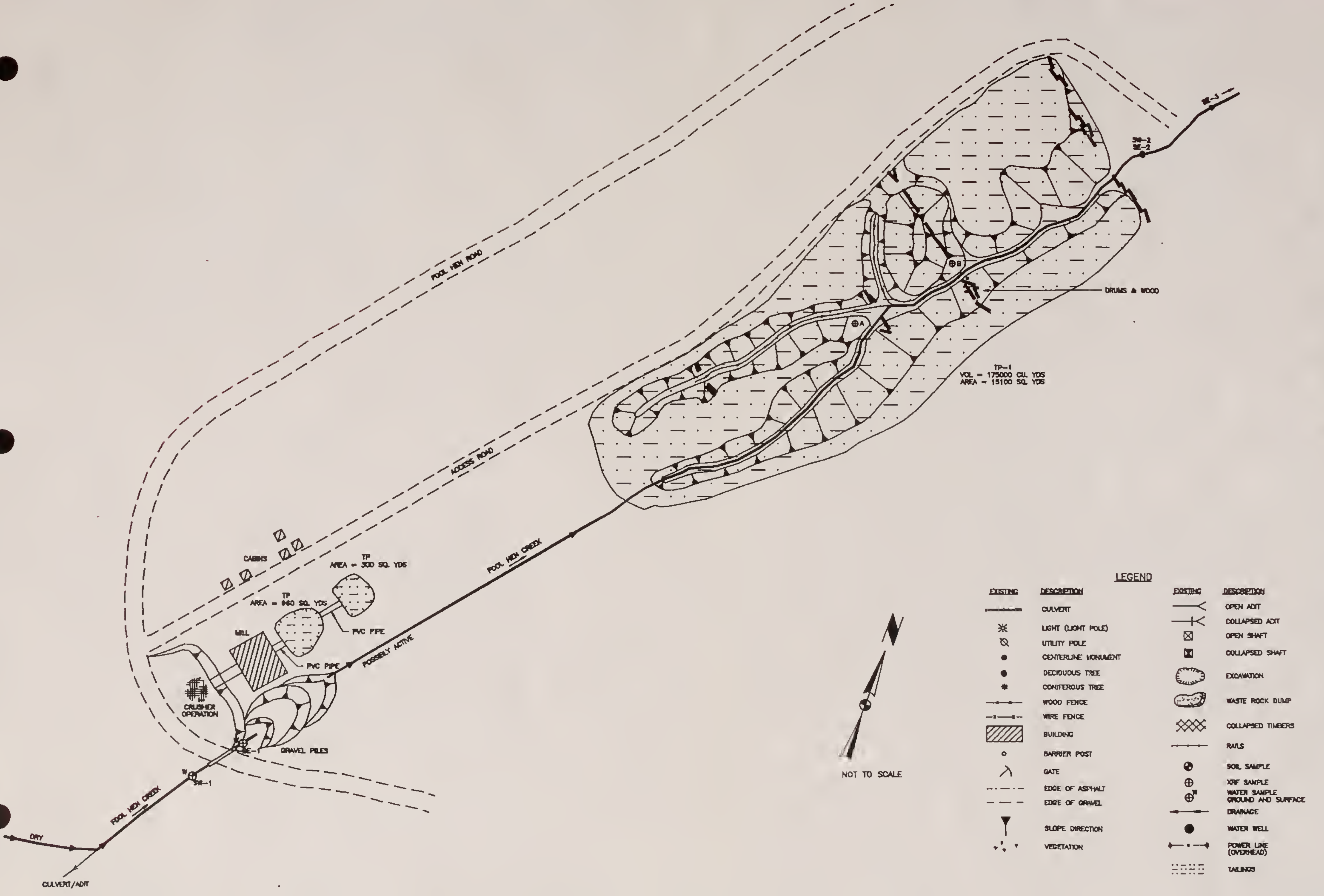
Well No.: M:67646
Location: 13N 07W 12
Site Name: CLEARMON TED
County: Lewis & Clark
Depth: 105.0
Yield: 20.0
Static Water Level: Flowing
Pumping Water Level: 100.0
Year drilled: 1984
Driller:
Driller's License: 253
DNRC Well No.:



PIONEER
TECHNICAL SERVICES, INC.

NE NW S13, P.A. NO. 25-197

T13N, R07W, SECTION 13
SCALE: 1" = 1000'



MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

NE NW SECTION 13 PA# 25-197
STEMPLE DISTRICT LEWIS AND CLARK COUNTY

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

DRAWN MWC DATE 10/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

TDH
THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.

25-197.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Silty sand to silty clay

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Deepest depth was 50 feet; tailings are now in piles because drainages have cut through.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Moist

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Breached

Comments on potential for mitigation: Berm and recontour

SOURCE INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-A	TAIL	175,000	South side of tailings, profile; 0-10.5', silty sand	None	7.0 (D)	0.02	25-197-TP-1	08/30/93 1700	T-Metals, ABA
TP-1A-B	TAIL		South side of tailings, profile; 10.5-13', silty clay	None	6.2 (D)	0.04			
TP-1A-C	TAIL		South side of tailings, profile; 13-30', silty sand	None	6.8 (D)	0.02	25-197-TP-2	08/30/93 1705	T-Metals, ABA, CN-
TP-1A-D	TAIL		South side of tailings, profile; underlying soil	None	6.5 (D)	0.01	N/A	N/A	XRF Analysis
TP-1B-A	TAIL		North side of tailings, profile; 0-15', tan fine-grained sand/silt	None	6.8 (D)	0.02			
TP-1B-B	TAIL		North side of tailings, profile; 15-30', fine-grained	None	7.0 (D)	0.02			
TP-1B-C	TAIL		North side of tailings, profile; 30-50', fine-grained	None	6.8 (D)	0.02			

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 25-197-TP-1 is composite of TP-1A-A and -1A-B, and TP-1B-A. 25-197-TP-2 is composite of TP-1A-C, and TP-1B-B and -1B-C.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X , No____, Number:______ Identification: The headwaters of Fool Hen Creek is an adit (SW-1).

Filled shafts: Yes___, No X , Number:____ Identification:____________

Seeps/Springs: Yes___, No X , Number:____ Identification:____________

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 404

Distance to nearest well used for drinking? 1,000 feet

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible X , Unlikely____.
Large uncontained source with surface water flow through it, but lo metals levels.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Fool Hen Creek

Dry streambeds: Yes ___, No X, Name(s): ___

Other surface water: Yes ___, No X, Name(s)/Description: ___

Waste materials within any floodplain: Yes X, No ___ Source ID(s): TP-1 is in Fool Hen Creek.

Approximate Flood frequency? X 1 yr, ___ 10 yr, ___ 100 yr

Estimated seasonal flow of stream(s) (cfs)? 1
High Flow: 1.5, Average Flow: 1

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No ___,
Describe: Fool Hen Creek flows through TP-1.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, wetland, fishery

Observed erosional/sedimentation/stream turbidity problems? Yes X, No ___, Distance downstream (ft)? 1000 Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):
Tailings from the site are noted the entire length downstream in Fool Hen Creek (1,000 feet) until confluence with Virginia Creek.

SURFACE WATER INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	1,300 feet upgradient from TP-1 in Fool Hen Creek	7.77	199	302	8.5	113	1 cfs (M)	25-197-SW-1	08/30/93 1050	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SW-2	SW	75 feet downgradient from TP-1 in Fool Hen Creek	8.67	212	496	7.7	111	1 cfs (M)	25-197-SW-2	08/30/93 1050	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	75 feet downgradient from TP-1 in Fool Hen Creek	N/A	N/A	N/A	N/A	N/A	N/A	25-197-SE-2	08/30/93 1050	T-Metals
SE-3	SE	1,000 feet downgradient of TP-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): No upgradient sediment available to sample.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 0 acres

Wetlands present: Yes___, No_X_, Describe:

Carbonate rocks/soils: Yes_X_, No___, Describe: Possible limestone

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100_X_; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 1,000 feet

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
TP-1	None	Moist	135,900	67,950	Yes	Moderate

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes_____, No_X_, Describe:________

Population within 1 mile: 1-10___; 10-30_X_; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments________

Evidence of recreational use on site: Yes___, No_X_, Describe:________

Accessibility - Fences, warning signs, closed roads?_Unrestricted_

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment________
Wilderness Area - Yes___, No_X_, Comment________
T&E Species Habitat - Yes_X_, No___, Comment_Peregrine Falcon_
Bat Habitat - Yes___, No_X_, Comment________

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium___, Low_X_
Wetlands Frontage - High___, Medium___, Low_X_
Fisheries Habitat and Species Classification - _4_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_1_, types and locations: Culvert headwaters of Fool Hen Creek

Hazardous structures: Yes_X_, No___, Number_5_, types and locations: Cabins

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations:________

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_, Number____, types and locations:________

Fire and/or Explosion hazards: Yes_X_, No___, Explain:_Wood cabins_

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for NE NW Section 13, Prepared by Northern Engineering and Testing, July 26, 1988.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle, 1968.

LABORATORY ANALYTICAL DATA

NE NW S13
PA NO. 25-197

NE NW Section 13 PA# 25-197
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BABITS
INVESTIGATION DATE: 08/30/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-197-SE-2	4.97 U	42.2 JX	1.1 J	1.04 U	6.89	18.9	2680	5.66 JX	239	2.26 U	59.9 J	6.57 UJ	72.3	2.61
25-197-TP-1	10.5	124 JX	1.8 J	2.48	17.5	33.3	6140	1.55 JX	599	7.43 J	87.1 J	5.65 UJ	195	NR
25-197-TP-2	13.7	134 JX	3.5 J	1.55	17.9	78	7250	0.313 JX	1260	6.55 J	256 J	7.12 UJ	317	2.2
BACKGROUND	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
25-197-TP-1	<0.01	0	139	139	<0.01	<0.01	0.01	0	139
25-197-TP-1DUP	<0.01	0	138	138	<0.01	<0.01	0.01	0	138
25-197-TP-2	0.47	14.7	2.58	-12.	0.3	0.14	0.03	4.37	-1.8

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-197-SW-1	5.83 J	416	2.57 U	9.7 U	13.3 J	31.3 J	11.8 UX	0.12 U	4.08 U	12.7 U	2.55 J	30.7 U	7.57 U	116
25-197-SW-2	90.8 J	396	2.57 U	9.7 U	6.83 U	4.9 J	73.2 JX	0.12 U	26.8	12.7 U	24.5 J	30.7 U	7.57 U	116

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-197-SW-1	119	< 5	5	0.13	< 0.005
25-197-SW-2	127	< 5	6	0.08	< 0.005

LEGEND

SE2 - Downgradient (75') from tailings pond 1 in Fool Hen Creek.
SW2 - Same as sample SE2.
TP1 - Composite of subsamples TP1A-A, 1A-B, and 1B-A.
TP2 - Composite of subsamples TP1A-C, 1B-B, and 1B-C.
BACKGROUND - From SE SW Sec. 10 (25-212-SS-1).

XRF ANALYSIS RESULTS

NE NW S13
PA NO. 25-197

Mine Name: NE NW Section 13 PA# 25-197
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25-197-SE-3		6570.19	43631.3	500.364	327.83 *	933.247 *	6693.35			139.917 *		73.7429
25-197-TP1A-A		5639.56	47902.8	445.197	329.976	629.414 *	6936.24			141.702 *	50.4804 *	78.0488
25-197-TP1A-B		24996.8	63246.7	1235.78	208.039 *	1614.76 *	18748.4			443.554		102.373
25-197-TP1A-C		12988.5	82600.3	801.866	288.172 *	1352.69 *	14084.1		101.319 *	525.248		143.798
25-197-TP1A-D		11421.5	55548.4	787.234	232.462 *	708.404 *	11133.2			318.415		87.2619
25-197-TP1B-A		7770.06	46147.4	428.944	307.762	687.15 *	7654.49			147.814 *		75.2298
25-197-TP1B-B		4068.43	68439.2	325.441	281.348 *	856.456 *	5458.57			119.843 *		99.8089
25-197-TP1B-C		5853.6	60811.2	311.945	252.801 *	620.571 *	5938.22			157.873 *		93.9773
25-197-TP-1-COMP		13647.3	57509.4	727.685	206.766 *	942.975 *	10625.5			236.875 *		95.9119
25-197-TP-2-COMP		6200.46	70098.3	331.556	315.846	975.278 *	7336.31			265.955		110.086

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25-197-SE-3	63.6614				39.4913			282.267			
25-197-TP1A-A	74.3579			43.289 *	41.3456 *			273.504			11.5906 *
25-197-TP1A-B	129.037				120.327			784.4			
25-197-TP1A-C	64.8129				70.6303			434.924			14.3463 *
25-197-TP1A-D	89.6669				72.8657			385.536	123.055 *		
25-197-TP1B-A	56.5626				45.3534 *			317.553			9.35933 *
25-197-TP1B-B	32.6017				23.5814 *			191.469			
25-197-TP1B-C	49.1897				39.5201 *			243.023	106.624 *		
25-197-TP-1-COMP	84.2616				69.1488			570.439	86.9608 *		12.3376 *
25-197-TP-2-COMP	38.3914				40.032 *			297.118	93.9374 *		

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

NE NW S13
PA NO. 25-197

MDSL AMRB/PIONEER 4/9/93

AIMSS SCORESHEET

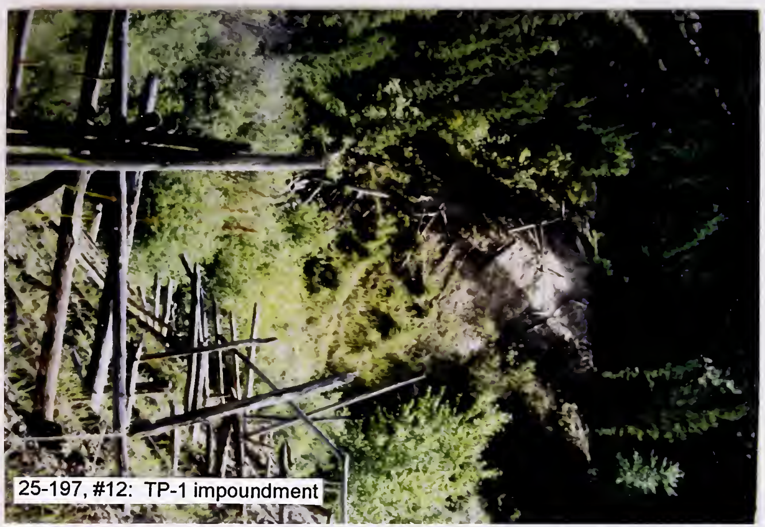
SITE NAME: NE NW SECTION 13
PA NUMBER: 25-197

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	7.324
6	GW - TARGETS	WELLS - 1 MI. x 2.5		7.5
7		WELLS - 1 TO 4 MI		401
8		NEAREST WELL		5
9		TARGETS SCORE	LINES 6 + 7 + 8	413.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	1211390
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		300
12		EXCEEDENCES		100
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	800
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	8.052
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	24
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	154598
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		15
26B		DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	150
27		LIKELIHOOD SCORE	LINES 25 + 26C	150
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.004
29	AIR - TARGETS	POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		5
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	40
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	24
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	200
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.004
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		5
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	15
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	12
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			13.66

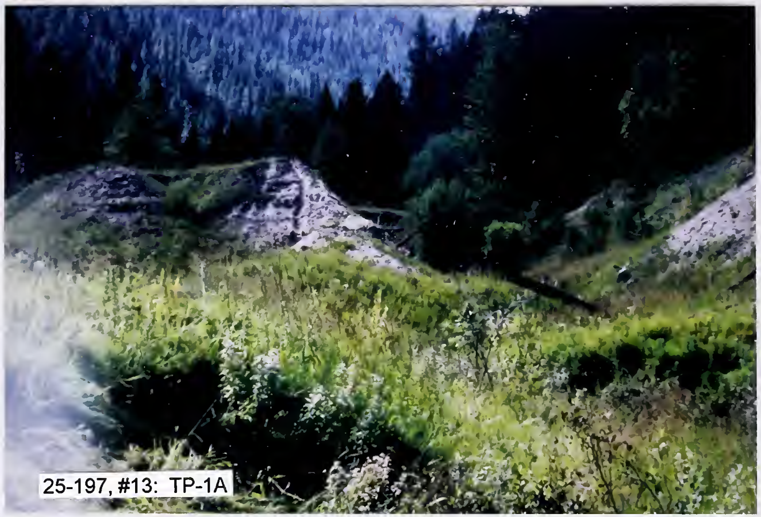
SITE NAME: NE NW SECTION 13
PA NUMBER: 25-197

SITE SAFETY

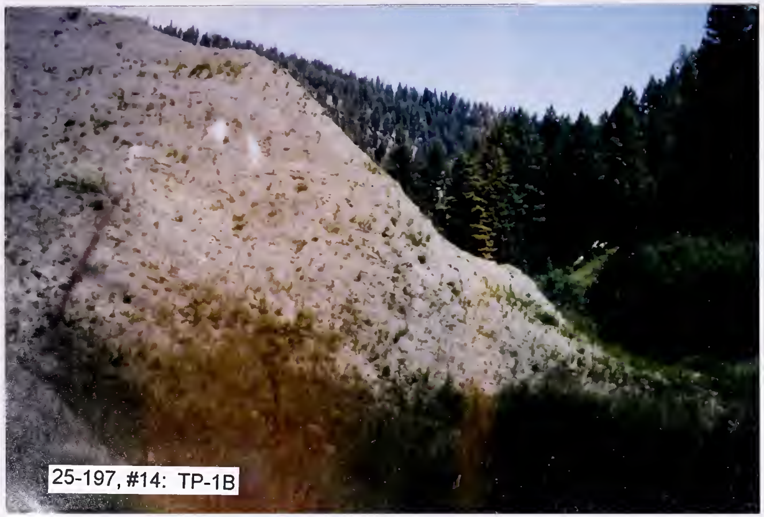
LINE NO.				
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	200
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	250
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	15
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**75.00**



25-197, #12: TP-1 impoundment



25-197, #13: TP-1A



25-197, #14: TP-1B

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: SWANSEA TAILINGS/MINE **PA#:** 25-208

Date: September 1, 1993 **Time:** 1100-1800

Field Team Leader: Bullock, Pioneer

Sampling Personnel: Flammang, M. Babits,
S. Babits; Pioneer
Pierson; TD&H

Visitors: None

Weather/Seasonality Observations: Scattered thunder storms; 60°F; light winds; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number)**:** #2: WR-1 and Shaft #1; #3: Shaft #2 (Silver Bell); #4: WR-2; #5: Adit at WR-3; #6: WR-3, looking east; #7: WR-4 and mill; #8: Ore cars on WR-4; #9: SW-1 sample location. Video Tape No. 6

General Comments/Observations (not covered specifically in attached Inventory Forms)**:** Also investigated mine dumps under PA# 25-009 (Silver Bell Mine).

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Isolate drainages from mine wastes; grade, amend, and revegetate waste materials.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SWANSEA TAILINGS/MINE PA#: 25-208

Legal Description: T 13N ;R 7W ;Sec. 18 , NW1/4 NE1/4 ___1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 53' 27" Longitude: W 112° 32' 17"

Primary Drainage Basin and Code: Poorman Creek/17010201
Secondary Drainage Basin: Swansea Gulch

USGS Quadrangle map name(s): Swede Gulch

Mine Type/Commodities: Hardrock/Gold, Silver, Lead, Copper

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): C.L. Hewitt, 1314 Peosta, Helena, MT 59601; Helena National Forest.

Relationship to other mines/sites in the area/district: Silver Bell Mine located just above this site (sampled as part of this PA#) is on the same vein system. Many other mines in the area.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 5800'-6520' , Slope 5°-25° ,
Aspect East

Land use: Mining___, Recreational X , Residential___, Urban___,
Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? 2.0 acres.
Dimensions:

Predominant vegetation types: Lodgepole pine, Douglas fir, alder, willow, grouse whortleberry, huckleberry, bear grass

Access: roads - good___,poor X ,4wd___,trail___.
Other logistical considerations (proximity to other sites). Locked gate at Poorman Creek Road.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies in Swansea Gulch. The upper portion of the mine and TP-1 are located within an intermittent tributary to the gulch. WR-5 is located in the main fork of the gulch. Poorman Creek is 1/3 mile below WR-5.

Mining/milling history, ore type/tenor, host rock, gangue: Mill was destroyed by fire in 1949. No other information available.

Mine Operation?

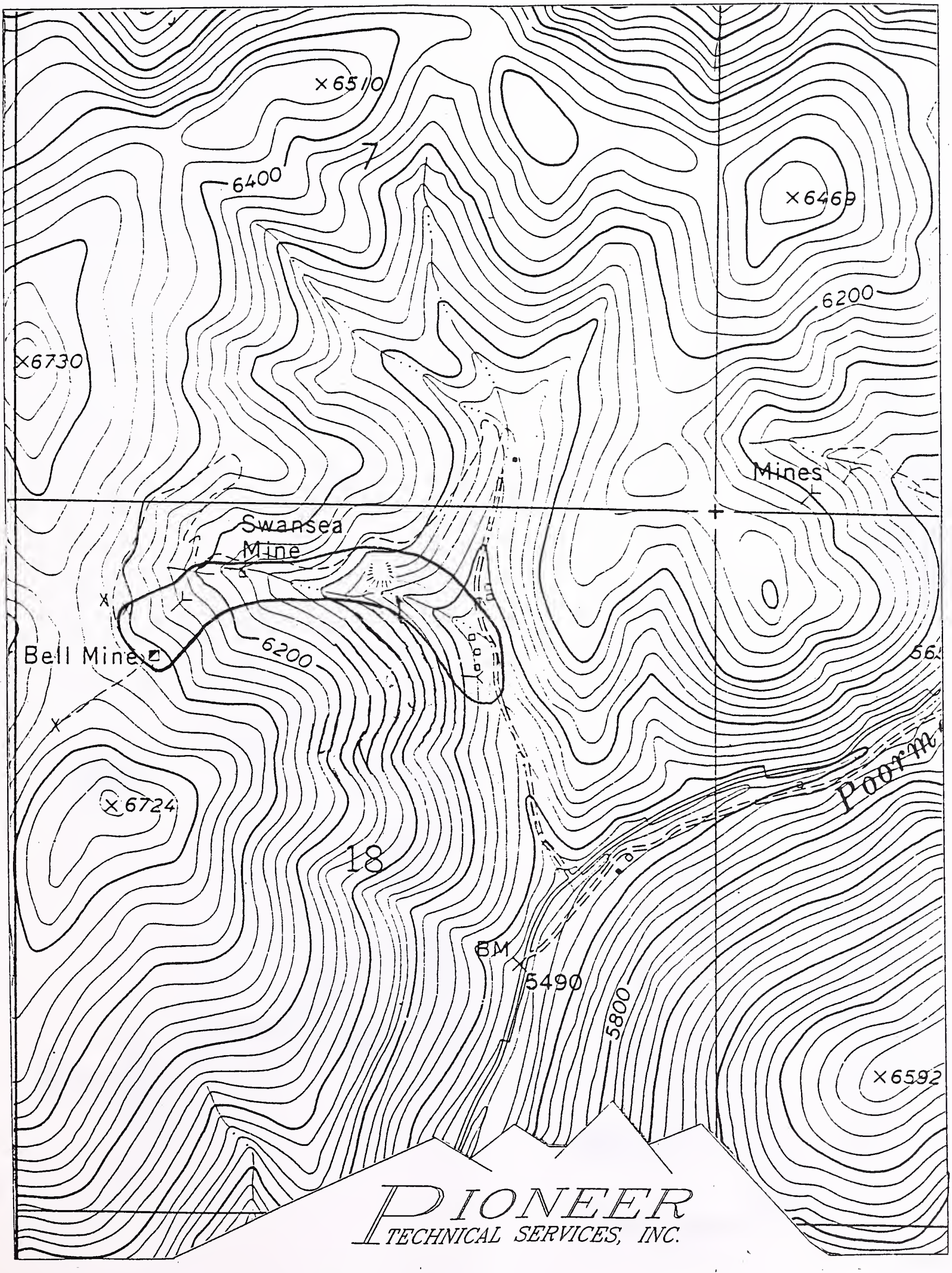
Shafts -	Yes X,	No ___,	# 2,	Comment
Adits -	Yes X,	No ___,	# 4,	Comment
Pits -	Yes X,	No ___,	# 2,	Comment
Placers -	Yes ___,	No X,	# ___,	Comment
Other -	Yes ___,	No X,	# ___,	Comment

Mill Operation? Yes X, No ____. If yes answer the next three questions:

Period(s) of Operation: Unknown to 1949

Origin of Ore Milled - Custom Mill ___ Dedicated Mill X; Number and names of mines that supplied mill feed: Silver Bell and Swansea mines

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? Floatation or CN- vat

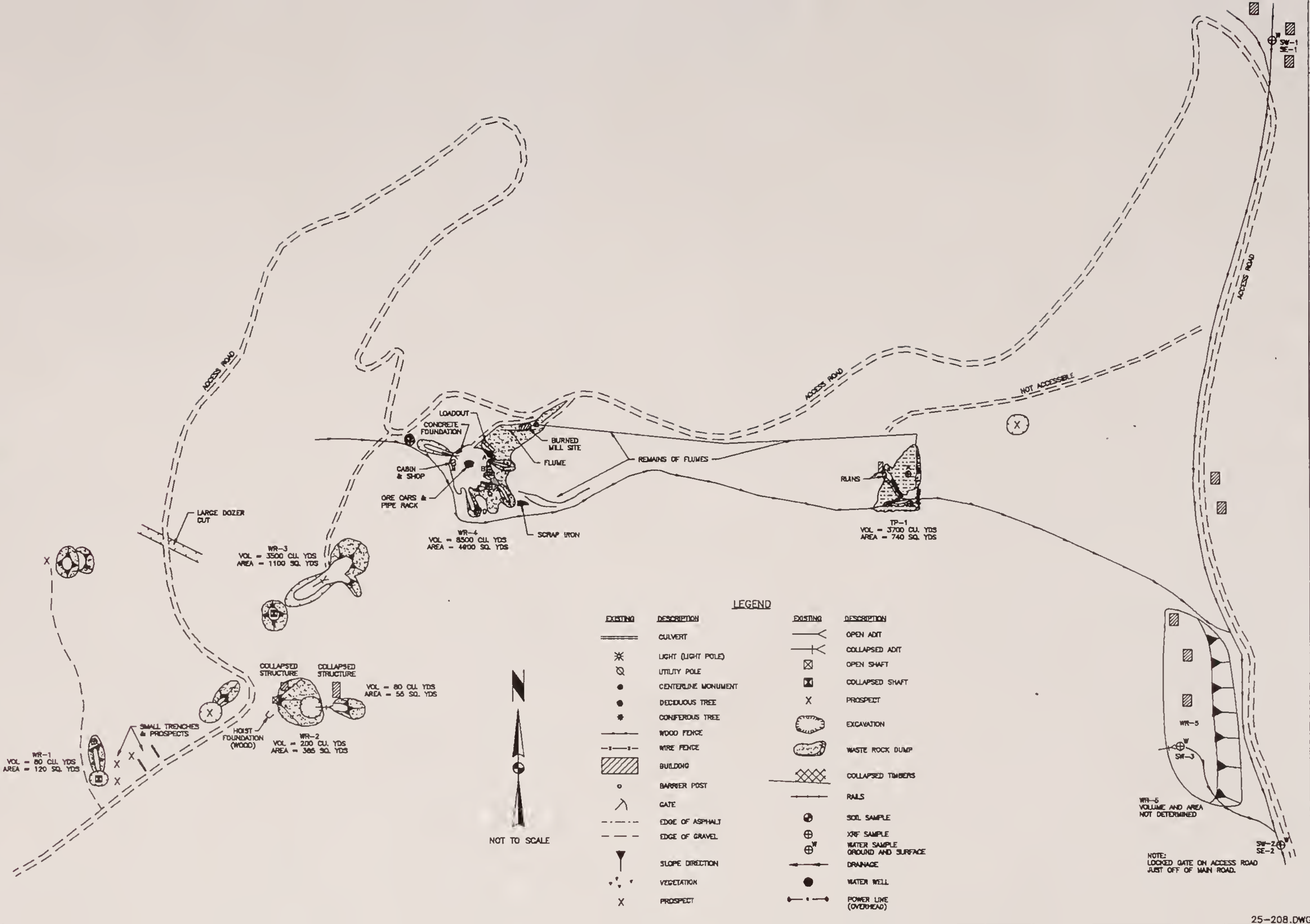


PIONEER
TECHNICAL SERVICES, INC.

SWANSEA TAILINGS, P.A. NO. 25-208

T13N, R07W, SECTION 18

SCALE: 1" = 1000'



MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

SWANSEA PA# 25-208

STEMPLE DISTRICT LEWIS AND CLARK COUNTY

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

DRAWN MWC DATE 10/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

TD&H
THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.

25-208.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Medium sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Impoundment has a maximum depth of 20 feet; no stratification noted.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry in top 9 feet; wet below.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Impoundment is breached; tailings actively eroding during storm events.

Comments on potential for mitigation: Pull out of drainage, regrade, and revegetate.

SOURCE INVENTORY FORM

SAMPLERS: Bullock, Flammang, M. Babits, S. Babits, Pierson

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-A	TAIL	3,700	North center borehole; 0-2.5', tan medium sand	Breached Impoundment	7.0 (D)	0.025	25-208-TP-1	09/01/93 2230	T-Metals, ABA
TP-1A-B	TAIL		2.5'-9', tan medium sand	Breached Impoundment	6.9 (D)	0.03			
TP-1A-C	TAIL		9'-13', wet tan medium sand	Breached Impoundment	5.5 (D)	0.03			
WR-1	WR	80	Upper most waste rock, off knob	None	6.3 (D)	0.02	25-208-WR-1	09/01/93 2215	T-Metals, ABA
WR-2A	WR	280	Waste rock assoc. with shaft, off knob	None	6.75 (D)	0.04			
WR-2B	WR		Waste rock assoc. with collapsed adit, off knob	None	6.8 (D)	0.03			
WR-3A	WR	3,500	West end of WR-3	None	6.9 (D)	0.03			
WR-3B	WR		East end of WR-3	None	6.6 (D)	0.04			
WR-4A	WR	8,500	Northern side of WR-4, near burned ramp	None	6.7 (D)	0.05	25-208-WR-2	09/01/93 2220	T-Metals, ABA
WR-4B	WR		South of WR-4A, east face of WR-4, north of major lobe	None	6.3 (D)	0.06			
WR-4C	WR		South of WR-4B, east of WR-4, south of major lobe	None	6.3 (D)	0.05			
WR-4D	WR		Southern most lobe, north side near top	None	6.7 (D)	0.04			
WR-5A	WR	ND	Lowest of workings below mill	None	6.0 (D)	0.05	25-208-WR-3	09/01/93 2225	T-Metals, ABA
WR-5B	WR		Lowest of workings below mill	None	5.2 (D)	0.04			
SS-1	BKGRND	N/A	Background soil 200 feet from WR-1 on ridge	N/A	6.9 (D)	0.04	25-208-SS-1	09/02/93 1310	T-Metals

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 25-208-TP-1 is composite of TP-1A-A through -1A-C. 25-208-WR-1 is composite of WR-1, WR-2A and -2B, and WR-3A and -3B. 25-208-WR-2 is composite of WR-4A through -4D. 25-208-WR-3 is composite of WR-5A and -5B. ND = Not Determined

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X , No___, Number: 1 Identification: Lower adit at WR-5; sampled as SW-3.

Filled shafts: Yes___, No X , Number:____ Identification:________

Seeps/Springs: Yes___, No X , Number:____ Identification:________

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 10

Distance to nearest well used for drinking? Approximately 1.6 miles to the year-round residence.

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible X , Unlikely____.
Groundwater is discharging from lower adit. Metal values in uncontaine waste rock dumps and tailings are elevated.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: Bullock

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-3	AD	Adit discharge at WR-5	21 gpm (M)	7.27	171	273	10	80	N/A	25-208-SW-3	09/01/93 1605	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Swansea Gulch past WR-5

Dry streambeds: Yes X, No ___, Name(s): Unnamed tributary of Swansea Gulch

Other surface water: Yes X, No ___, Name(s)/Description: Discharge from lowest adit, PVC pipe

Waste materials within any floodplain: Yes X, No ___ Source ID(s): TP-1, WR-3, WR-4, WR-5

Approximate Flood frequency? X 1 yr, ___ 10 yr, ___ 100 yr

Estimated seasonal flow of stream(s) (cfs)? ___
High Flow: 3 cfs, Average Flow: 0.3 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; Toe of WR-5 is in Swansea Gulch and discharge from lowest adit flows along toe of dump.

Surface water draining onto or through waste sources: Yes X, No ___,
Describe: Intermittent tributary flows through the tailings.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands, agriculture, possible residential, limited fishery

Observed erosional/sedimentation/stream turbidity problems? Yes X, No ___, Distance downstream (ft)? 1000+ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Elevated metal values in sediments for 1,000 or more feet downstream of WR-5.

SURFACE WATER INVENTORY FORM

SAMPLERS: Bullock, Pierson, M. Babits, S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Upgradient of mine and confluence, 40 feet up from where road crosses	7.06	210	233.5	NM	80	30 gpm (E)	25-208-SW-1	09/01/93 1740	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	Upgradient of mine and confluence, 40 feet up from where road crosses	N/A	N/A	N/A	N/A	N/A	N/A	25-208-SE-1	09/01/93 1740	T-Metals
SW-2	SW	Swansea Gulch; downgradient of WR-5	5.2	185	285	9.4	80	50 gpm (E)	25-208-SW-2	09/01/93 1640	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	Swansea Gulch; downgradient of WR-5	N/A	N/A	N/A	N/A	N/A	N/A	25-208-SE-2	09/01/93 1640	T-Metals
SE-500	SE	500 feet downstream of SE-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
SE-1000	SE	1,000 feet downstream of SE-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approximately 5 acres of moderately sloping drainage

Wetlands present: Yes X , No ____, Describe: Very small streamside wetlands below WR-5

Carbonate rocks/soils: Yes ____, No X , Describe: None observed

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ____; 10-30 ____; 30-100 X ; 100-300 ____; 300-1,000 ____; 1,000-3,000 ____; 3,000-10,000 ____; 10,000 or greater ____; Comments ____

Nearest residence(ft or miles)? Recreational cabin 1/4 mile below WR-5

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, Flammang, M. Babits, S. Babits, Pierson

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1	None	Partial	6,600	6,000	Yes	Low
WR-1	None	Dry	1,100	1,100	No	None
WR-2	None	Dry	3,800	3,800	No	None
WR-3	None	Dry	10,000	9,000	No	None
WR-4	None	Dry	44,100	39,700	No	None
WR-5	None	Partial	ND	ND	No	None

Notes and Clarifications: WR-1 through WR-4 were moist during this investigation due to rain.
ND = Not Determined

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes_____, No X ,
Describe:________________________________

Population within 1 mile: 1-10 X ; 10-30___; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments________________________________

Evidence of recreational use on site: Yes___, No X , Describe:________

Accessibility - Fences, warning signs, closed roads? Locked gate at turnoff from Poorman Creek Road

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No X , Comment________________
Wilderness Area - Yes___, No X , Comment________________
T&E Species Habitat - Yes X , No___, Comment Grizzly; Bald Eagle
Bat Habitat - Yes___, No X , Comment________________

Primary Drainage___; Secondary Drainage X ; No Information___:

Riparian Habitat Quality - High X , Medium___, Low___
Wetlands Frontage - High___, Medium X , Low___
Fisheries Habitat and Species Classification - 3
Sport Fishery Classification - 3

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X , No___, Number 1 , types and locations:___ Shaft at WR-2A is 40 feet deep and dimensions are 25 feet x 25 feet.

Hazardous structures: Yes X , No___, Number 13 , types and locations:_ Mine buildings and cabins

Unstable highwalls, pits, trenches, slopes: Yes X , No___, Number 2 , types and locations: Hole, 20 feet deep, associated with collapsed adit at WR-2B; pit associated with collapsed shaft at WR-2A.

Unstable waste piles, impoundments, undercut banks: Yes X , No____, Number 4 , types and locations: WR-2 through WR-5 are all steep, unvegetated and at angle of repose.

Fire and/or Explosion hazards: Yes X , No_____, Explain: Woode structures

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Swansea, Prepared by Northern Engineering and Testing, July 18 and 19, 1988.

USGS, Topographic Map, Swede Gulch, Montana, 7 1/2 minute Quadrangle, 1968.

XRF ANALYSIS RESULTS

SWANSEA TAILINGS/MINE
PA NO. 25-208

MDSL AMRB/PIONEER 4/9/93

Mine Name: Swansea Tailings PA# 25−208
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25−208−SE−1000			4059.25	396.178 *			6746.16		689.973	239.932		164.736
25−208−SE−500			2831.04	281.568 *			5302.09		585.381	212.309		214.672
25−208−SS−1	375.189 *		8028.79	2679.61		725.276 *	17021		242.877	125.2 *	35.0332 *	621.546
25−208−TP1A−A			2043.3				4473.95		952.431	523.364		35.9076
25−208−TP1A−B			2125.77	289.923 *			5226.47		1266.99	399.764		63.4466
25−208−TP1A−C	315.715 *		2311.28	112.019 *			5660.62		2237.6	450.628		31.8649
25−208−TP−1−COMP		5652.15	1646.84	178.769 *	190.338 *	318.931 *	5024.83		1576.76	401.471		47.7078
25−208−WR2−A	244.448 *		4224.9	369.63 *		434.329 *	14782.7		1096.19	340.904		191.402
25−208−WR2−B			3246	169.27 *		817.711 *	13764.9		1299.91	482.875		114.318
25−208−WR3−A			3284.68				4376.65		737.127	282.978		17.4318
25−208−WR3−B	434.361 *		7913.71	1519.61		469.45 *	22073.7		998.062	335.34		427.665
25−208−WR4−A	305.928 *		5535.45	550.701		1369.47	21304.3		2830.6	1173.4		212.653
25−208−WR4−B	429.81 *		5923.1	1149.2		734.363 *	21306.1		408.544	147.875	39.4612 *	219.785
25−208−WR4−C	422.502 *		10339.5	1808.45		1156.38	27890.8		529.039	185.536	40.6842 *	109.544
25−208−WR4−D	318.307 *		2801.01	220.507 *		718.038 *	10698.4		1837.15	395.343		76.6518
25−208−WR5−A	409.937 *		23345	1073.27		502.259 *	16777		279.705	247.163		332.073
25−208−WR5−B			11982.2	325.539 *		404.927 *	8956.06		447.64	302.845		84.1296
25−208−WR−1	343.475 *	17771.7	8227.98	1641.27		636.813 *	18864.5		2710.23	248.994		139.902
25−208−WR−1−COMP	272.959 *		5814.4	825.868		389.019 *	15286.4		1297.32	318.369		176.356
25−208−WR−2−COMP	316.988 *		5990.52	899.035		1206.25	18741.5	234.061 *	1621.16	475.233		187.602
25−208−WR−3−COMP	302.571 *		14659.2	553.097		465.778 *	10920.4		394.933	374.413		188.368

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25−208−SE−1000	60.1972		6.21936 *	782.284	67.9066		52.8632 *	468.826			
25−208−SE−500	64.9837		4.10518 *	632.273	71.7486		55.993 *	664.996	88.4383 *		8.99485 *
25−208−SS−1	177.739			24.0919 *	156.211			1246.44			14.695 *
25−208−TP1A−A	25.194		13.3506	1174.08	48.0848		100.312 *	135.059			
25−208−TP1A−B	20.5197		9.86468 *	1581.72	56.6407		56.237 *	222.894	115.938 *		12.8606 *
25−208−TP1A−C	10.3302 *		8.76387 *	1741.56	34.1214		136.473 *	102.159	111.281 *		
25−208−TP−1−COMP	16.2686		9.41619 *	1650.47	44.147		126.845 *	129.923			
25−208−WR2−A	56.1599		4.10243 *	418.598	142.713			882.784			10.4901 *
25−208−WR2−B	55.4477		32.1191	1621.4	126.09		377.627	495.853	127.097 *		11.711 *
25−208−WR3−A	2.77448 *		14.4098	1301.4	30.8054 *		54.2566 *	30.6136 *			13.4085 *
25−208−WR3−B	88.4632		14.7597 *	782.11	151.682		73.7808 *	1051.33	176.383 *		10.6288 *
25−208−WR4−A	66.9719		5.12797 *	1365.27	146.138		61.896 *	851.22			
25−208−WR4−B	92.3638			72.3119	302.603			1362.82			8.74671 *
25−208−WR4−C	238.985			35.2669 *	190.455			1186.67			18.1201 *
25−208−WR4−D	28.163		20.5769	2499.69	71.4045		90.5766 *	268.579			
25−208−WR5−A	82.3081			176.433	172.319			1047.37	88.7121 *		9.09401 *
25−208−WR5−B	30.4517	35.7471 *	11.2392 *	462.167	100.036			348.295	80.8656 *		
25−208−WR−1	110.27			419.111	140.241		812.077	705.403	116.275 *		11.4291 *
25−208−WR−1−COMP	57.4301		25.3524	1121.17	113.989		281.43	649.424	91.3353 *		
25−208−WR−2−COMP	83.1992		7.77256 *	1257.64	185.87			1060.25			15.4035 *
25−208−WR−3−COMP	45.0933		5.9773 *	333.197	97.7689			680.728	94.2712 *		7.35017 *

* − Estimated Quantity
$ − Unvalidated Data

LABORATORY ANALYTICAL DATA

SWANSEA TAILINGS/MINE
PA NO. 25-208

MDSL AMRB/PIONEER 4/9/93

Swansea Tailings PA# 25−208
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER − BULLOCK
INVESTIGATION DATE: 09/01/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25−208−SE−1	19.1 J	61 J	6.3	3.15 J	13.2 J	1160 JX	5730	0.046 UX	146	7.92 J	863	11.8 J	275 J	NR
25−208−SE−2	4.24 U	67.6 J	0.8 U	4.22 J	16.7 J	15.2 JX	8190	0.030 UX	291	11.6 J	24.2	5.6 UJ	49.3 J	NR
25−208−TP−1	49.5 J	29.5 J	25.0	1.59 J	6.44 J	2010 JX	5230	0.033 UX	183	3.46 J	2510	39.1 J	503 J	4.14
25−208−WR−1	32.8 J	67.9 J	6.4	4.77 J	16.5 J	1050 JX	7760	0.179 JX	285	12.1 J	815	22.5 J	217 J	NR
25−208−WR−2	22.5 J	173 J	13.4	8.38 J	19.4 J	1910 JX	13900	0.318 JX	1130	22.4 J	1610	5.97 UJ	629 J	NR
25−208−WR−3	8.2 J	80.6 J	13.5	4.34 J	14.8 J	361 JX	7230	0.736 JX	425	14.2 J	361	5.66 UJ	239 J	NR
BACKGROUND	19.5 J	168 J	1 U	9.67 J	36.5 J	228 JX	12800	0.032 UX	468	30.4 J	34.4	6.95 UJ	66.9 J	NR

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
25−208−TP−1	<0.01	0	3.23	3.23	<0.01	<0.01	<0.01	0	3.23
25−208−WR−1	<0.01	0	9.64	9.64	<0.01	0.01	<0.01	0.31	9.33
25−208−WR−2DUP	<0.01	0	8.18	8.18	<0.01	<0.01	<0.01	0	8.18
25−208−WR−2	<0.01	0	8.42	8.42	<0.01	<0.01	<0.01	0	8.42
25−208−WR−3	<0.01	0	37.3	37.3	<0.01	0.01	<0.01	0.31	37

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25−208−SW−1	7.15 J	62.9	2.57 U	9.7 U	11.9 J	21.3 J	265 JX	0.12 U	17.5	12.7 U	4.32 J	30.7 U	9.5	90.9
25−208−SW−2	3.92 J	88.8	2.57 U	9.7 U	12.6 J	15.2 J	19.4 JX	0.12 U	4.13	12.7 U	2.53 J	30.7 U	7.6	79.2
25−208−SW−3	1.18 U	91.4	4.59 U	5 U	6.24 U	2.33 U	14.7	0.12 U	3.76 U	10.9 U	0.82	31.7 U	11.5	73.6

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2−N	CYANIDE
25−208−SW−1	117	< 5	10	0.11	NR
25−208−SW−2	106	< 5	9	0.07	NR
25−208−SW−3	77	< 5	< 5	0.15	NR

LEGEND

SE1 − Upgradient of mine and confluence; 40' up from raod crossing.
SE2 − Swansea Gulch; downgradient of waste rock dump 5.
TP1 − Composite of subsamples TP1A−A through 1A−C.
WR1 − Composite of subsamples WR1, 2A, 2B, 3A, and 3B.
WR2 − Composite of subsamples WR4A through 4D.
WR3 − Composite of subsamples WR5A and 5B.
BACKGROUND − From the Swansea Tailings (25−208−SS−1).
WR2DUP − Duplicate of the 25−208−WR−2 sample.

SW1 − Same as sample SE1.
SW2 − Same as sample SE2.
SW3 − Adit discharge at waste rock dump 5.

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

SWANSEA TAILINGS
PA NO. 25-208

AIMSS SCORESHEET

SITE NAME: SWANSEA TAILINGS/MINE
PA NUMBER: 25-208

GROUNDWATER PATHWAY

LINE NO.				
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	20.007
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		10
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	10.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	80028

SURFACE WATER PATHWAY

11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	21.967
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19		FISHERY		5
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	28
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	246030

AIR PATHWAY

25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		10
26B		DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	100
27		LIKELIHOOD SCORE	LINES 25 + 26C	100
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.333
29	AIR - TARGETS	POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		5
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	50
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	1665

DIRECT CONTACT PATHWAY

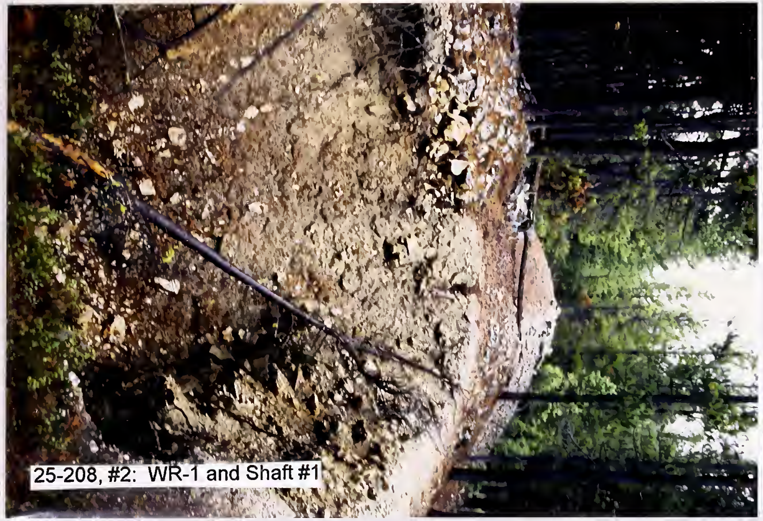
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37A		ACCESSIBILITY		5
37B		DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	50
38		LIKELIHOOD SCORE	LINES 36 + 37C	50
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.300
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		5
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	6
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	90

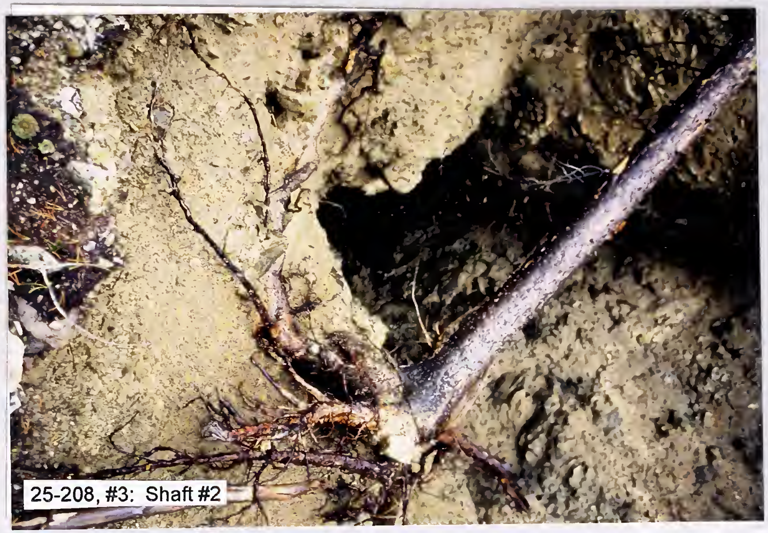
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000	**3.28**

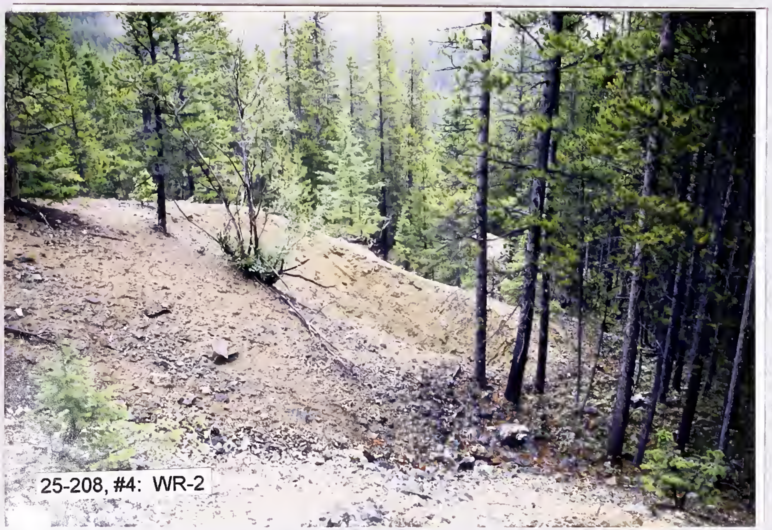
SITE NAME: SWANSEA TAILINGS/MINE
PA NUMBER: 25-208

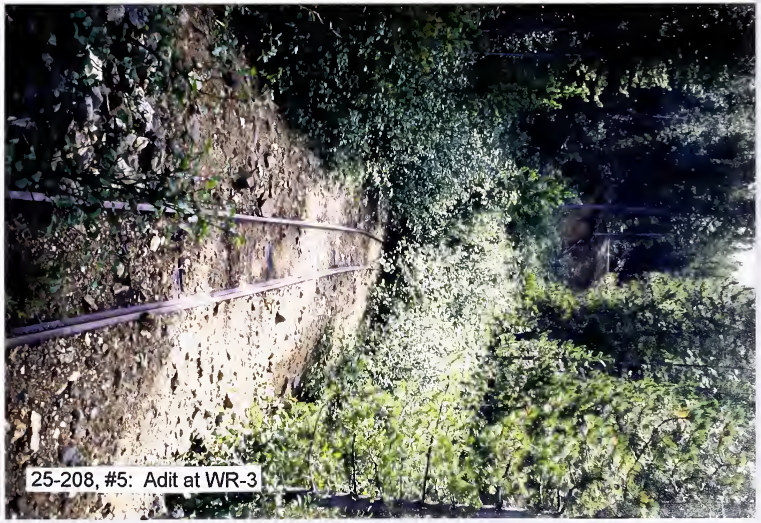
SITE SAFETY

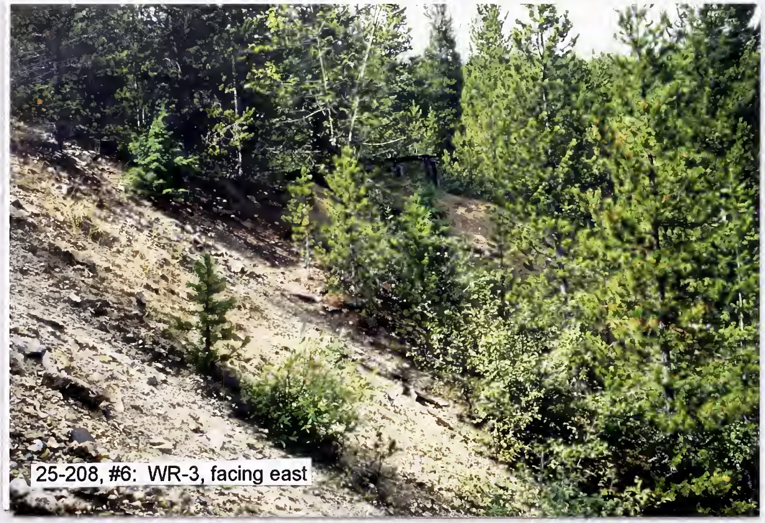
LINE NO.				
1	THREAT	ACCESSIBILITY		5
2		OPEN SHAFTS	100 EA.	100
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	150
5		HAZ. STRUCTURES	40 EA.	520
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	770
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	6
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**23.10**


25-208, #2: WR-1 and Shaft #1

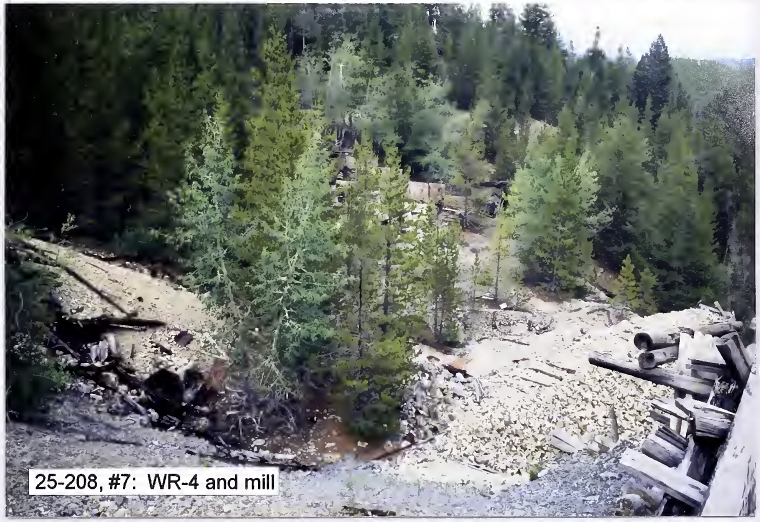

25-208, #3: Shaft #2


25-208, #4: WR-2

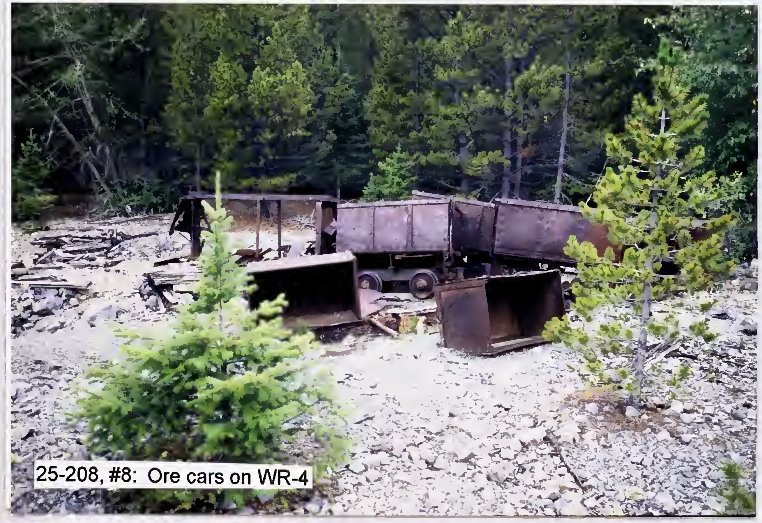

25-208, #5: Adit at WR-3



25-208, #6: WR-3, facing east



25-208, #7: WR-4 and mill



25-208, #8: Ore cars on WR-4

25-208, #9: SW-1 sample location

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: SE SW S10 PA#: 25-212

Date: August 30, 1993 Time: 1530

Field Team Leader: M. Babits, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: None

Weather/Seasonality Observations: Clear; warm (65°F); slight breeze; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #15: TP-1A in foreground with mill in background; #16: Mill building. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Tailings are revegetating themselves; although Hg is elevated. There is no adit discharge. No reclamation is needed for this site.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SE SW S10 PA#: 25-212

Legal Description: T 13N ;R 7W ;Sec. 10 , SE1/4 SW1/4 ___1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 53' 38" Longitude: W 112° 28' 45"

Primary Drainage Basin and Code: Canyon Creek/10030101
Secondary Drainage Basin: Virginia Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Millsite/Unknown

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Public
Owner, Agent, or Contact(Include address and phone when available): Jim Alexander, P.O. Box 9717, Helena, MT 59604; Shekinah Gold Mines, Box 207, Elliston, MT 59728; Marylou Wahlberg, 171 Eight Mile Lane E Shore Rt., Polson, MT 59101; Helena National Forest.

Relationship to other mines/sites in the area/district: Numerous mines in the drainage.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 5950' , Slope 10° ,
Aspect Northeast

Land use: Mining___, Recreational X , Residential___, Urban___,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 0.5 acres.
Dimensions:

Predominant vegetation types: Lodgepole pine

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites). Along Stemple Pass Road

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 2 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Virginia Creek flows northeast approx. 160 feet from the site and meets Gold Creek 750 feet downgradient of the site.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?
Shafts - Yes___, No X, # _____, Comment
Adits - Yes___, No X, # _____, Comment
Pits - Yes___, No X, # _____, Comment
Placers - Yes___, No X, # _____, Comment
Other - Yes___, No X, # _____, Comment

Mill Operation? Yes X, No____. If yes answer the next three questions:

Period(s) of Operation: Unknown

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? Unknown

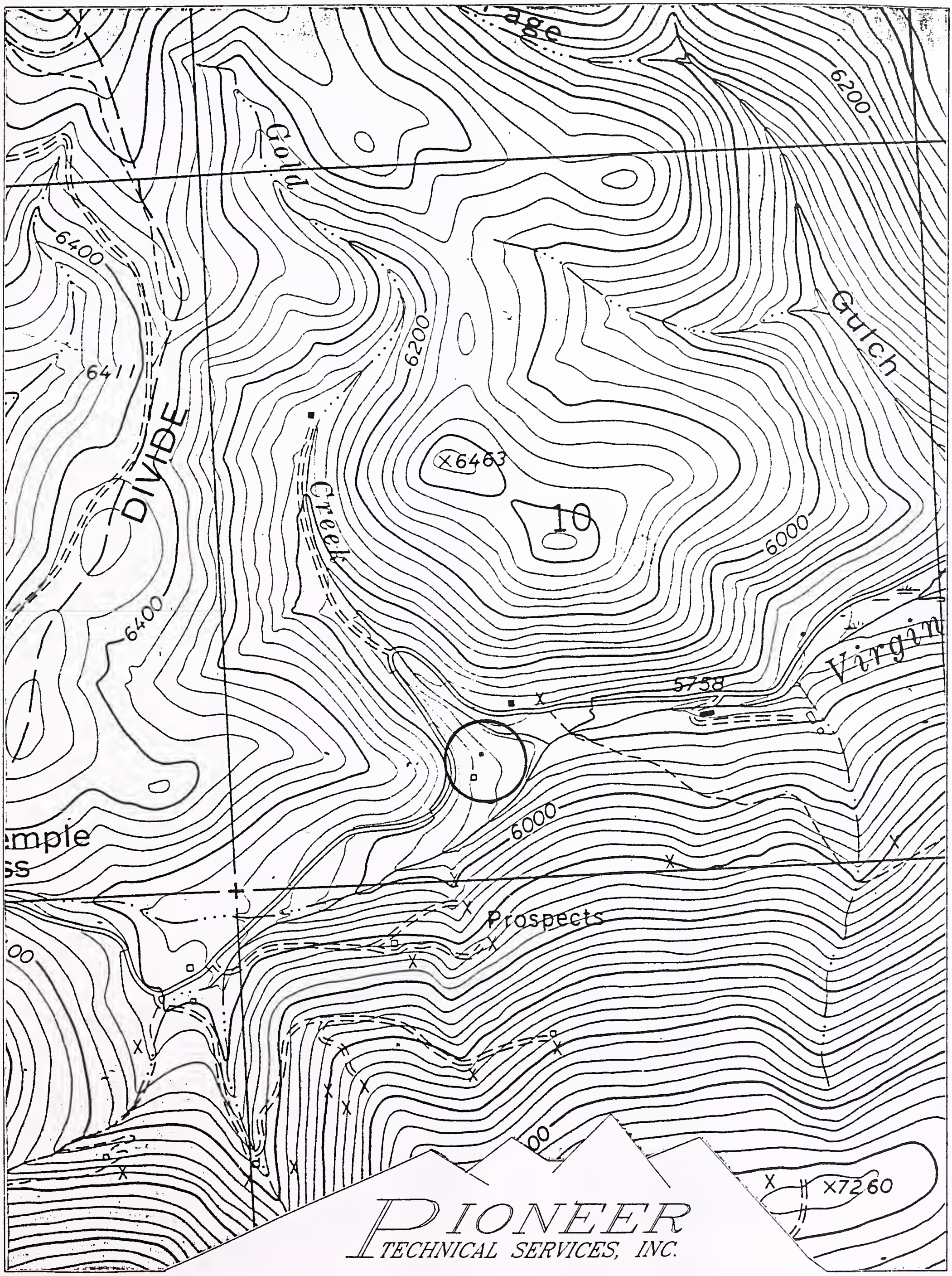
Montana Bureau of Mines and Geology
Water Well Log Data

06/10/1993

Well No.: M:67645
Location: 13N 07W 11 DA
Site Name: VENDER FRED # 2
County: Lewis & Clark
Depth: 4.0
Yield: 10.0
Static Water Level: 3.00
Pumping Water Level: 0.0
Year drilled: 1961
Driller:
Driller's License:
DNRC Well No.:

Well No.: M:67644
Location: 13N 07W 11 DA
Site Name: VENDER FRED # 1
County: Lewis & Clark
Depth: 6.0
Yield: 10.0
Static Water Level: 3.00
Pumping Water Level: 0.0
Year drilled: 1961
Driller:
Driller's License:
DNRC Well No.:

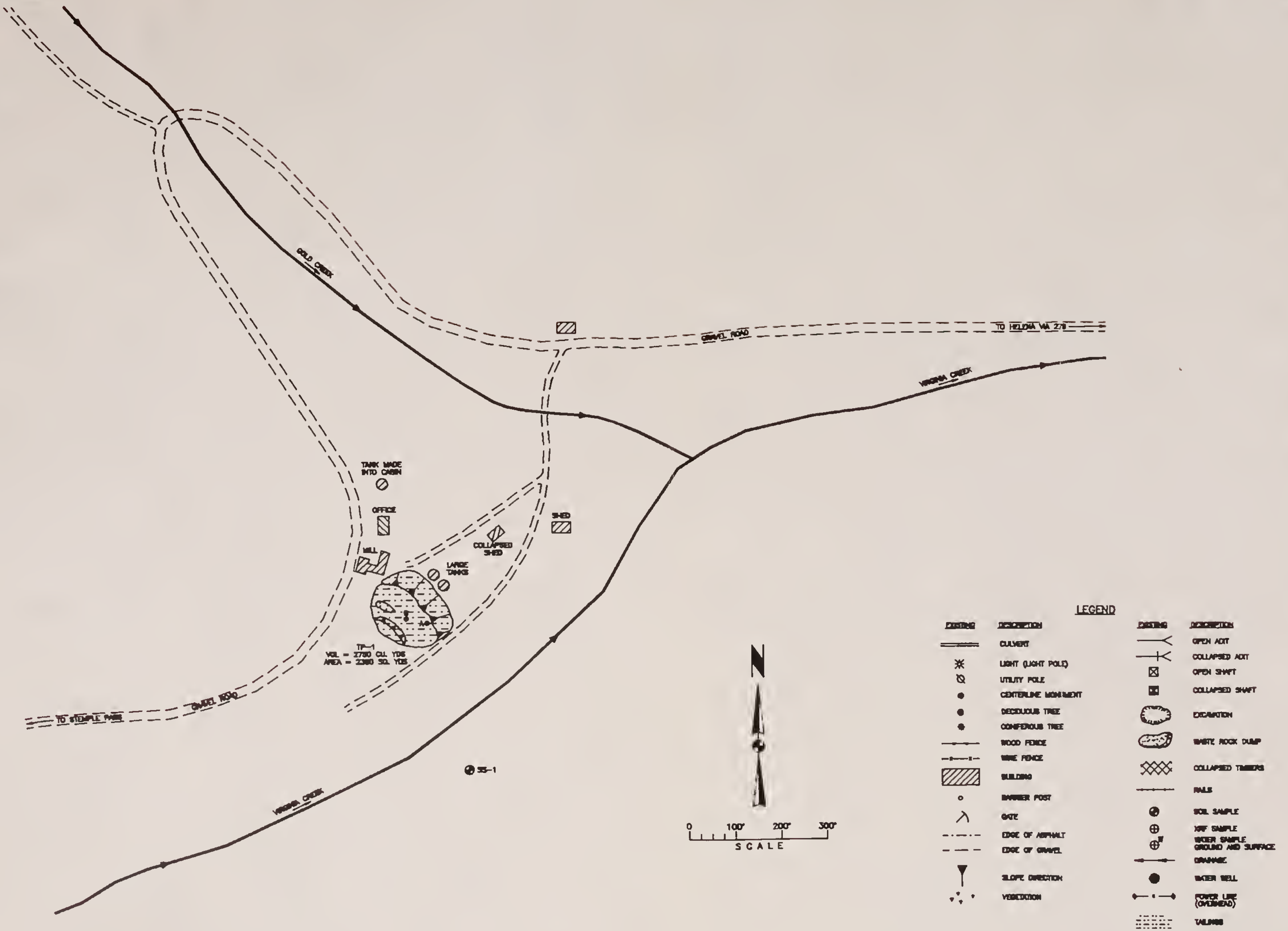
Well No.: M:67646
Location: 13N 07W 12
Site Name: CLEARMON TED
County: Lewis & Clark
Depth: 105.0
Yield: 20.0
Static Water Level: Flowing
Pumping Water Level: 100.0
Year drilled: 1984
Driller:
Driller's License: 253
DNRC Well No.:



PIONEER
TECHNICAL SERVICES, INC.

SE SW S10, P.A. NO. 25-212

T13N, R07W, SECTION 10
SCALE: 1" = 1000'



25-212.DWG

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

SE SW SECTION 10 PA# 25-212
STEMPLE DISTRICT LEWIS AND CLARK COUNTY

PIONEER

DRAWN WWC DATE 10/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.
SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Silty clay and fine sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Deepest depth was 4.5 feet.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Moist to saturated

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Berm only

Comments on potential for mitigation: Nothing needed; although Hg is elevated.

SOURCE INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-A	TAIL	2,750	Middle of pond; 0-2.5', red fine sand	None	6.6 (D)	0.02	25-212-TP-1	08/30/93 1800	T-Metals, ABA, CN-
TP-1B-A	TAIL		Next to berm; 0-2.5', silt/clay	None	6.0 (D)	0.03			
TP-1B-B	TAIL		Next to berm; 2.5-4.5', silt/clay	None	6.0 (D)	0.04			
SS-1	BKGRND	N/A	Background soil on the east side of Virginia Creek	N/A	6.85 (D)	0.03	25-212-SS-1	08/30/93 1740	T-Metals

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 25-212-TP-1 is composite of TP-1A-A and TP-1B-A and -1B-B.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:____________

Filled shafts: Yes___, No_X_, Number:____ Identification:____________

Seeps/Springs: Yes___, No_X_, Number:____ Identification:____________

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs: 404

Distance to nearest well used for drinking? 1 mile

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible_X_, Unlikely____.
Uncontained source and shallow water levels; however, no discharging adit and low metals levels in tailings.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X , Name(s):

Dry streambeds: Yes____, No X , Name(s):

Other surface water: Yes____, No X , Name(s)/Description:

Waste materials within any floodplain: Yes____, No X Source ID(s):

Approximate Flood frequency?___1 yr,___10 yr,___100 yr

Estimated seasonal flow of stream(s) (cfs)? N/A
High Flow:____________, Average Flow:____________

Distance between waste source(s) and nearest surface water body (ft)? 19
160 feet between TP-1 and Virginia Creek

Surface water draining onto or through waste sources: Yes____, No X ,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, wetland, fishery

Observed erosional/sedimentation/stream turbidity problems? Yes_____, No X , Distance downstream (ft)?________ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SURFACE WATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC μS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

____

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? No acid mine drainage

Wetlands present: Yes X , No ___, Describe: Streamside

Carbonate rocks/soils: Yes ___, No X , Describe: ___

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ___; 10-30 ___; 30-100 X ; 100-300 ___; 300-1,000 ___; 1,000-3,000 ___; 3,000-10,000 ___; 10,000 or greater ___; Comments ___

Nearest residence(ft or miles)? 1 mile

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
TP-1	None	Moist	21,420	21,420	Yes	Low/None

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes_____, No_X_,
Describe:_____

Population within 1 mile: 1-10___; 10-30_X_; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments_____

Evidence of recreational use on site: Yes___, No_X_, Describe:_____

Accessibility - Fences, warning signs, closed roads? Unrestricted

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment_____
Wilderness Area - Yes___, No_X_, Comment_____
T&E Species Habitat - Yes_X_, No___, Comment Peregrine Falcon
Bat Habitat - Yes___, No_X_, Comment_____

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium___, Low_X_
Wetlands Frontage - High___, Medium___, Low_X_
Fisheries Habitat and Species Classification - 4
Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No_X_, Number____, types and locations:_____

Hazardous structures: Yes_X_, No___, Number_1_, types and locations:
Mill building

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes_X_, No____, Explain: Wood mill building

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for SE SW Section 10, Prepared by Northern Engineering and Testing, July 26, 1988.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle, 1968.

LABORATORY ANALYTICAL DATA

SE SW S10
PA NO. 25-212

SE SW Section 10 PA# 25–212
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER – BABITS
INVESTIGATION DATE: 08/30/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25–212–TP–1	47.6	278 JX	2.9 J	5.86	4.24	92.8	14300	8.15 JX	803	11.7 J	215 J	6.28 UJ	190	0.305 U
BACKGROUND	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
25–212–TP–1	<0.01	0	170	170	<0.01	<0.01	<0.01	0	170

LEGEND

TP1 – Composite of subsamples TP1A–A, 1B–A, and 1B–B.
BACKGROUND – On East side of Virginia Creek.
From SE SW Sec. 10 (25–212–SS–1).

XRF ANALYSIS RESULTS

SE SW S10
PA NO. 25-212

Mine Name: SE SW Section 10 PA# 25-212
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25-212-SS-1		5310.42	4728.17	1016.01	166.404 *		11439.3		59.3841 *	147.851 *	58.8874 *	76.4319
25-212-TP1A-A		18971.4	18290.2	1098.69	213.805	631.025	13848.9	-64.7969	48.1493	103.531	52.2664	75.6391
25-212-TP1B-A		20081	40253.7	906.571	264.463 *	565.302 *	10005.1		57.1812 *	163.487		58.9817
25-212-TP1B-B		39171.3	35950	1351.42	322.83 *	1274.47	23020.6			425.25		54.4661
25-212-TP-1-COMP		34806.4	44423.5	1522.12		1105.21 *	19249.8			256.344		71.0417

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25-212-SS-1	134.032				62.2321			277.92	62.8797 *		8.5375 *
25-212-TP1A-A	132.805	-14.1932	8.01665		87.5752	-11.6491	-3.60022	614.647	93.7462	8.1824	11.1829
25-212-TP1B-A	99.1486		3.99054 *		89.7429			470.454	136.366 *		7.70025 *
25-212-TP1B-B	157.552				173.437			590.1	158.516 *	15.8705 *	10.4878 *
25-212-TP-1-COMP	152.957				145.796	144.8 *		764.607	84.8388 *		9.87856 *

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

SE SW S10
PA NO. 25-212

AIMSS SCORESHEET

SITE NAME: SE SW SECTION 10
PA NUMBER: 25-212

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.190
6	GW - TARGETS	WELLS - 1 MI. x 2.5		5.0
7		WELLS - 1 TO 4 MI		402
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	407.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	30932
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.216
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	23
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	199
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		0
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	0
27		LIKELIHOOD SCORE	LINES 25 + 26C	0
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.022
29	AIR - TARGETS	POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		0
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	35
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	0
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37A		ACCESSIBILITY		0
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	0
38		LIKELIHOOD SCORE	LINES 36 + 37C	0
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.019
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	10
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			**0.31**

SITE NAME: SE SW SECTION 10
PA NUMBER: 25-212

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		0
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	40
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	10
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**0.00**

25-212, #15: TP-1A in (foreground)

25-212, #16: Mill building

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: PANGEWASSET PA#: 25-226

Date: August 31, 1993 Time: 0845

Field Team Leader: M. Babits, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: None

Weather/Seasonality Observations: Partly cloudy; warm (60°F); breezy (10-15 mph); cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #17: WR-1; #18: TP-1. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Tailings are well vegetated. Waste rock needs flatter slopes to revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): PANGEWASSET PA#: 25-226

Legal Description: T 13N ;R 7W ;Sec. 15 , SE1/4 SE1/4 ___1/4

County: LEWIS AND CLARK Mining District: STEMPLE

Latitude: N 46° 52' 40" Longitude: W 112° 28' 03"

Primary Drainage Basin and Code: Virginia Creek/10030101
Secondary Drainage Basin: Gould Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Hardrock/Gold

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): Mary Ann Manger, Box 5567, Helena, MT 59604.

Relationship to other mines/sites in the area/district: The Astor site is located east of Pangewasset on Gould Creek.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 6600' , Slope 20° , Aspect South

Land use: Mining___, Recreational___, Residential___, Urban___, Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 1.5 acres.
Dimensions:

Predominant vegetation types: Mixed pine forest

Access: roads - good___,poor___,4wd X ,trail___.
Other logistical considerations (proximity to other sites). Locked gate on Gould Creek; access on jeep trail from Stemple Pass.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on slope above headwaters of perennial Gould Creek. Water leaving the site would flow southeast to Gould Creek and then east in the creek.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

Shafts - Yes___, No X, # ___, Comment

Adits - Yes X, No___, # 1, Comment Open

Pits - Yes___, No X, # ___, Comment

Placers - Yes___, No X, # ___, Comment

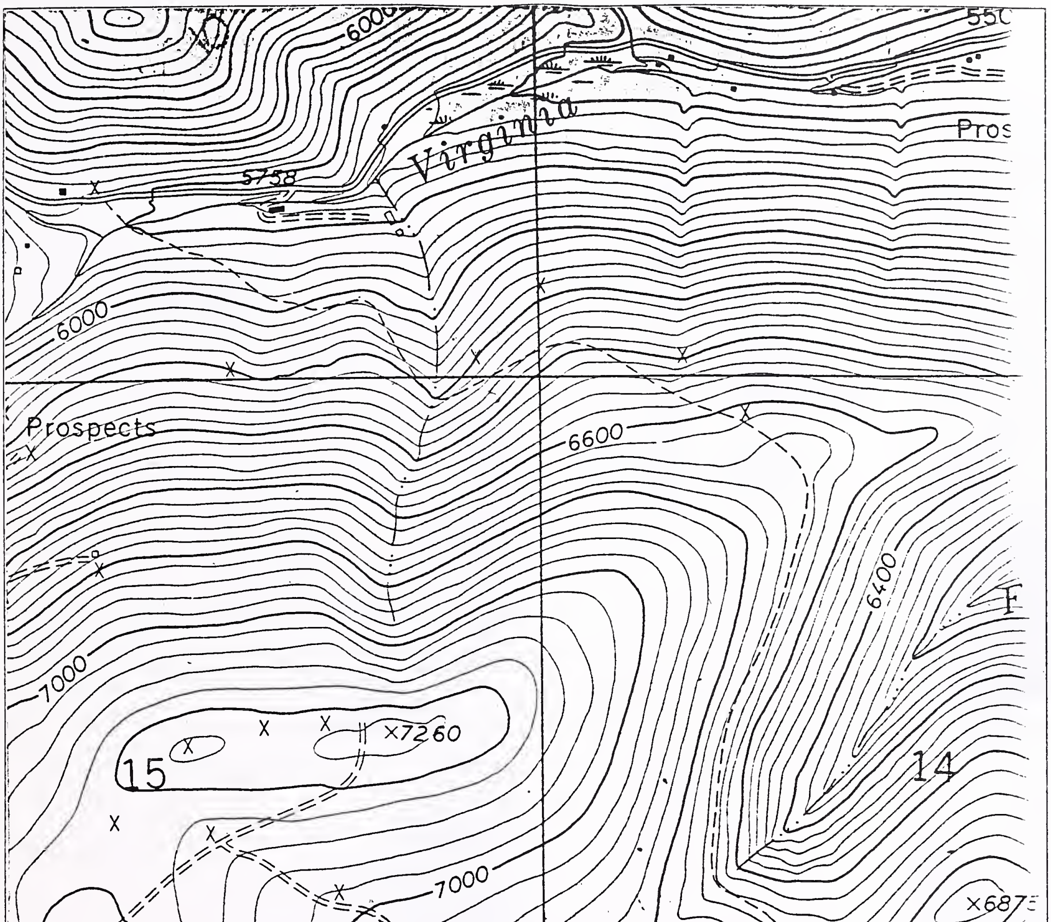
Other - Yes___, No X, # ___, Comment

Mill Operation? Yes X, No___. If yes answer the next three questions:

Period(s) of Operation: Unknown; tailings exist, but no mill building was observed during investigation.

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

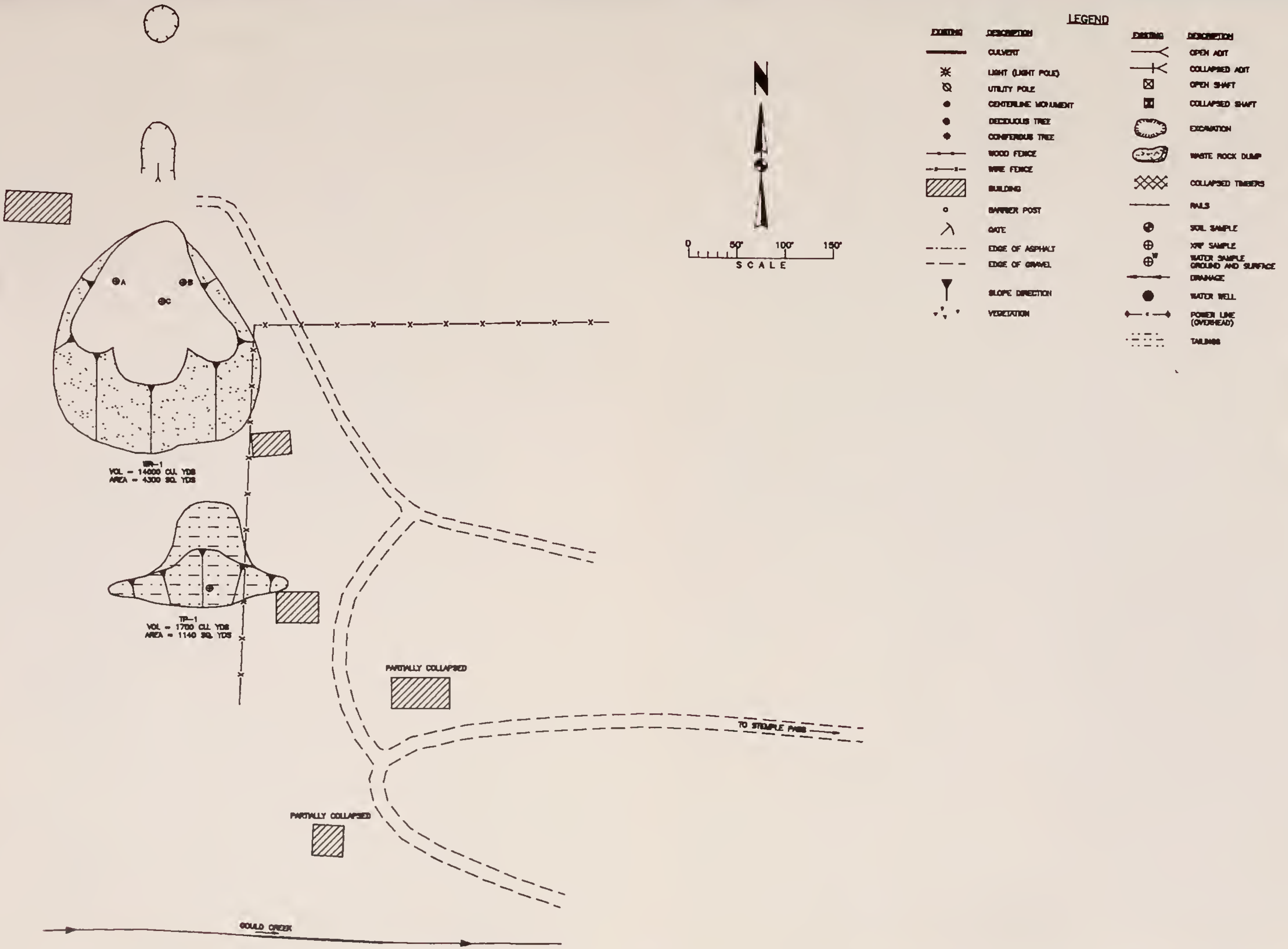
Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? Unknown



PIONEER
TECHNICAL SERVICES, INC.

PANGEWASSET, P.A. NO. 25-226

T13N, R07W, SECTION 15
SCALE: 1" = 1000'



DRAWN WMC DATE 11/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

PIONEER

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

PANGEWASSET PA# 25-226
STEMPLE DISTRICT LEWIS AND CLARK COUNTY

SHEET NO.

25-226.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): 100% fine sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Deepest depth is 9 feet.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Moist

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Berm of tailings

Comments on potential for mitigation: Will probably revegetate itself.

SOURCE INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A	TAIL	1,700	Near berm, borehole; 0-3′	None	7.0 (D)	0.03	25-226-TP-1	08/31/93 1645	T-Metals, ABA, CN-
TP-1B	TAIL		Near berm, borehole; 3-6′	None	7.0 (D)	0.03			
TP-1C	TAIL		Near berm, borehole; 6-9′	None	7.0 (D)	0.04			
WR-1A	WR	14,000	Near adit, on top of west side	None	6.7 (D)	0.03	25-226-WR-1	08/31/93 1645	T-Metals, ABA
WR-1B	WR		Near adit, on top of east side	None	7.0 (D)	0.04			
WR-1C	WR		Near adit, on top of center	None	7.0 (D)	0.025			

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 25-226-TP-1 is composite of TP-1A through -1C. 25-226-WR-1 is composite of WR-1A through -1C.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:____

Filled shafts: Yes___, No_X_, Number:____ Identification:____

Seeps/Springs: Yes___, No_X_, Number:____ Identification:____

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs:_10_

Distance to nearest well used for drinking?_2 miles_

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely_X_.
Very little elevated metals and far from surface water.

Other observations/notes:_N/A_

GROUNDWATER INVENTORY FORM

SAMPLERS: ______________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______________________

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Gould Creek

Dry streambeds: Yes ___, No X, Name(s):

Other surface water: Yes ___, No X, Name(s)/Description:

Waste materials within any floodplain: Yes ___, No X Source ID(s):

Approximate Flood frequency? X 1 yr, ___ 10 yr, ___ 100 yr

Estimated seasonal flow of stream(s) (cfs)? 50 gpm during sampling
High Flow: 50 gpm, Average Flow: 30 gpm

Distance between waste source(s) and nearest surface water body (ft)? 340 feet

Surface water draining onto or through waste sources: Yes ___, No X,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Fishery, wetland, irrigation

Observed erosional/sedimentation/stream turbidity problems? Yes ___, No X, Distance downstream (ft)? ___ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SURFACE WATER INVENTORY FORM

SAMPLERS: ______________________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______________________________

____

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 30 acres

Wetlands present: Yes X , No ___, Describe: Streamside

Carbonate rocks/soils: Yes X , No ___, Describe: Carbonate precipitates

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X ; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 2 mile

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1	None	Moist	10,260	2,000	Yes	Low
WR-1	None	Moist	38,700	34,830	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_,
Describe:

Population within 1 mile: 1-10_X_; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments

Evidence of recreational use on site: Yes___, No_X_, Describe:

Accessibility - Fences, warning signs, closed roads? Unrestricted

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment
Wilderness Area - Yes___, No_X_, Comment
T&E Species Habitat - Yes___, No_X_, Comment
Bat Habitat - Yes_X_, No___, Comment Adit at WR-1

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium___, Low Not Rated
Wetlands Frontage - High___, Medium___, Low Not Rated
Fisheries Habitat and Species Classification - Not Rated
Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_1_, types and locations:
Adit at WR-1

Hazardous structures: Yes_X_, No___, Number_5_, types and locations:
Cabins

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____,
types and locations:

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_,
Number____, types and locations:

Fire and/or Explosion hazards: Yes_X_, No___, Explain: Wood cabins

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Pangewasset, Prepared by Northern Engineering and Testing, July 29, 1988.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle, 1968.

LABORATORY ANALYTICAL DATA

PANGEWASSET
PA NO. 25-226

Pangewasset PA# 25−226
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER − BABITS
INVESTIGATION DATE: 08/31/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25−226−TP−1	4.33 U	10.6 JX	0.8 U	1.08	2.33	7.81	2430	0.626 JX	83.7	2.06 J	8.93 J	5.72 UJ	17.1	0.263 U
25−226−WR−1	14.8	274 JX	0.8 J	4.53	5.13	30.6	10400	0.693 JX	369	8.98 J	32.9 J	4.6 UJ	68.7	NR
BACKGROUND	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
25−226−TP−1	<0.01	0	78.1	78.1	<0.01	<0.01	<0.01	0	78.1
25−226−WR−1	<0.01	0	109	109	<0.01	<0.01	0.01	0	109

LEGEND

TP1 − Composite of subsamples TP1A, 1B, and 1C.
WR1 − Composite of subsamples WR1A, 1B, and 1C.
BACKGROUND − From SE SW Sec. 10 (25−212−SS−1).

XRF ANALYSIS RESULTS

PANGEWASSET
PA NO. 25-226

MDSL AMRB/PIONEER 4/9/93

Mine Name: Pangewasset PA# 25-226
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25-226-TE	24.6952		28484.3	2243.5	161.535	620.126	19671	-77.4266	2.53027	79.9704	24.8745	78.117
25-226-TP1-A			38871	518.729	144.614 *		5379.09				44.0352 *	33.9715
25-226-TP1-B			30333.6	428.67	135.585 *		5227.64			40.0773 *	25.7229 *	30.5812
25-226-TP1-C			31760	612.93	162.73 *		6389.18					50.4922
25-226-TP-1-COMP			28693.7	453.31			5711.23					34.4623
25-226-WR1-A		25384	28484.3	2243.5	161.535 *	620.126 *	19671			79.9704 *		78.117
25-226-WR1-B			18839.2	3050.94			24620.2			65.4235 *		60.8538
25-226-WR1-C			10171.4	1234.69	212.937 *	605.498 *	14143.4			57.2647 *	28.7756 *	36.4042
25-226-WR-1-COMP			24840.7	2136.11		777.862 *	22591.1		55.9784 *	107.444 *	39.0714 *	81.0713

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25-226-TE	196.588	16.7717	-3.36883	33.9307	168.973	-20.3238	6.76765	568.833	54.9618		6.84392
25-226-TP1-A	76.1903				58.648			400.217			
25-226-TP1-B	56.3668				58.2037			292.073	65.2912 *		
25-226-TP1-C	73.8439				71.4188			408.507	70.6986 *		
25-226-TP-1-COMP	58.2304				66.5308			316.917			
25-226-WR1-A	196.588			33.9307 *	168.973			568.833			6.84392 *
25-226-WR1-B	258.562				175.864			1502.93	83.068 *		10.5729 *
25-226-WR1-C	104.156			27.4501 *	112.462			619.643			
25-226-WR-1-COMP	186.721			33.688 *	141.673			786.93	87.3664 *		7.96756 *

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

PANGEWASSET
PA NO. 25-226

AIMSS SCORESHEET

SITE NAME: PANGEWASSET
PA NUMBER: 25-226

GROUNDWATER PATHWAY

LINE NO.				
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		2
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	40
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	40
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.001
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		10
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	10.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	0

SURFACE WATER PATHWAY

LINE NO.				
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.002
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19	SW - TARGETS	FISHERY		0
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	17
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	1

AIR PATHWAY

LINE NO.				
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		10
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
29		POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		0
31	AIR - TARGETS	WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	30
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	0

DIRECT CONTACT PATHWAY

LINE NO.				
36		OBSERVED EXPOSURE		0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		5
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	25
38		LIKELIHOOD SCORE	LINES 36 + 37C	25
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	1
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0

LINE NO.		
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000	0.00

SITE NAME: PANGEWASSET
PA NUMBER: 25-226

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		5
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	200
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	250
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	1
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**1.25**

25-226, #17: WR-1

25-226, #18: TP-1

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: ASTOR **PA#:** 25-227

Date: August 31, 1993 **Time:** 1210

Field Team Leader: M. Babits, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: Jim Bogaerdt, Helena National Forest

Weather/Seasonality Observations: Partly cloudy to overcast; warm to cool; breezy (5-10 mph); cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #19: WR-1. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): The historic town of Gould is 0.5 mile upgradient from the site and a large dump and tailings impoundment are in Gould Creek.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Waste rock is neutral pH, with low metals, not steep, and could be revegetated.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): ASTOR PA#: 25-227

Legal Description: T 13N ;R 7W ;Sec. 23 , NE1/4NE 1/4 ___1/4

County: LEWIS AND CLARK Mining District: STEMPLE

Latitude: N 46° 52' 34" Longitude: W 112° 26' 54"

Primary Drainage Basin and Code: Virginia Creek/10030101
Secondary Drainage Basin: Gould Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Hardrock/Unknown

Activity Status: Active___,Inactive/Exploration X ,Abandoned___.

Ownership status: Known YX N___; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): William Whyte, Jr., 1104 Williams, Helena, MT 59601; Jim Alexander, P.O. Box 9717, Helena, MT 59604; Vern Knopf, P.O. Box 207, Elliston, MT 59728; Helena National Forest.

Relationship to other mines/sites in the area/district: The Pangewasset is one mile upgradient on Gould Creek.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Possible exploration permit

General site features: Elevation 6200' , Slope Moderate , Aspect East

Land use: Mining X , Recreational___, Residential___, Urban___, Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 1.2 acres.
Dimensions:

Predominant vegetation types: Mixed pine

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites). Two possible gate closings at the site.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Gould Creek flows west to east through the site and enters Virginia Creek three miles downstream.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

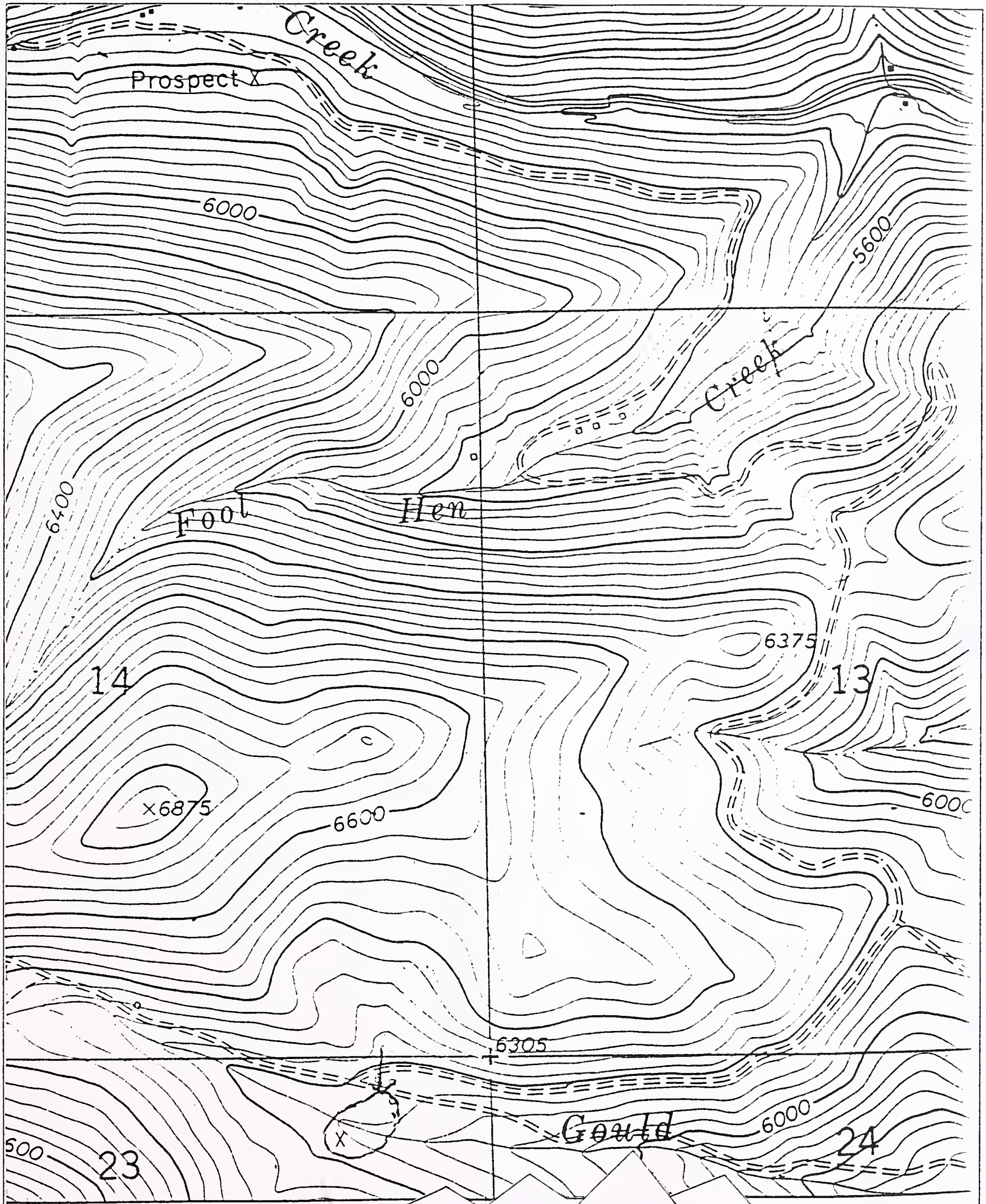
Shafts -	Yes___,	No X ,	# _____,	Comment
Adits -	Yes X ,	No___,	# 1 ,	Comment Collapsed
Pits -	Yes___,	No X ,	# _____,	Comment
Placers -	Yes___,	No X ,	# _____,	Comment
Other -	Yes___,	No X ,	# _____,	Comment

Mill Operation? Yes X , No____. If yes answer the next three questions:

Period(s) of Operation: Unknown

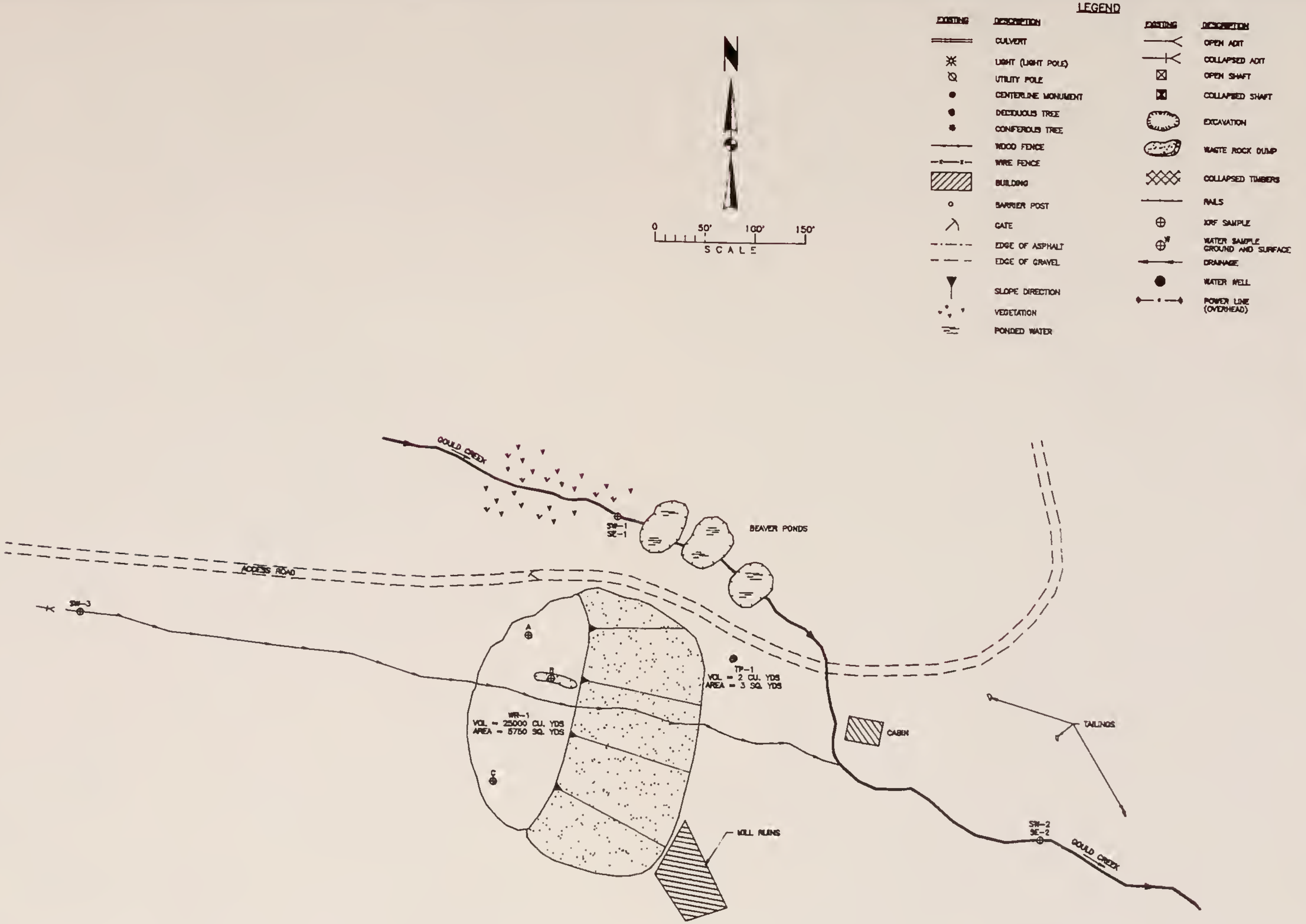
Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? Unknown



PIONEER
TECHNICAL SERVICES, INC.

ASTOR, P.A. NO. 25-227
T13N, R07W, SECTION 23
SCALE: 1" = 1000'



MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY
ASTOR PA# 25-227
STEMPLE DISTRICT LEWIS AND CLARK COUNTY

DRAWN MWC DATE 10/93
DESIGNED TPR JOB NO. 93-17
APPROVED F.B. NO.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.

25-227.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution(approximate % sand, silt, & clay): Silty clay

Determine tailings impoundment depth and describe stratification of the tailings if observable(based on texture and color): No impoundment; lenses only; one foot deep.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Moist

Describe condition of the tailings impoundment(Note condition of dams or structures, location of breaches): No impoundment

Comments on potential for mitigation: If tailings are present they are well vegetated.

SOURCE INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	25,000	North side	None	7.0 (D)	0.04	25-227-WR-1	08/31/93 1720	T-Metals, ABA
WR-1B	WR		Middle	None	7.0 (D)	0.05			
WR-1C	WR		South side	None	7.0 (D)	0.05			
TP-1A	TAIL	2	Base of mill, pile 1 foot deep	None	6.2 (D)	0.04	N/A	N/A	XRF Analysis

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 25-227-WR-1 is composite of WR-1A through -1C.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X , No___, Number: 1 Identification: Adit at WR-1

Filled shafts: Yes___, No X , Number:____ Identification:____________

Seeps/Springs: Yes___, No X , Number:____ Identification:____________

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 404

Distance to nearest well used for drinking? 2 miles

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible X , Unlikely____.
Uncontained source; adit discharge is in floodplain.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-3	AD	Discharging adit at WR-1	< 1 cfs (M)	7.65	219	253	4.9	92	N/A	25-227-SW-3	08/31/93 1420	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Gould Creek

Dry streambeds: Yes ___, No X, Name(s): ___

Other surface water: Yes X, No ___, Name(s)/Description: Adit discharge at WR-1

Waste materials within any floodplain: Yes X, No ___ Source ID(s): TP-1

Approximate Flood frequency? X 1 yr, ___ 10 yr, ___ 100 yr

Estimated seasonal flow of stream(s) (cfs)? 1.5 cfs
High Flow: 1.8 cfs, Average Flow: 1 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No ___,
Describe: Adit discharge through WR-1

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Fishery, irrigation, wetland

Observed erosional/sedimentation/stream turbidity problems? Yes ___, No X, Distance downstream (ft)? ___ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): ___

SURFACE WATER INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	175 feet upgradient in Gould Creek from mill building	8.13	257	222	8.6	134	1.5 cfs (M)	25-227-SW-1	08/31/93 1450	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	175 feet upgradient in Gould Creek from mill building	N/A	N/A	N/A	8.6	N/A	N/A	25-227-SE-1	08/31/93 1450	T-Metals
SW-2	SW	270 feet downgradient in Gould Creek from cabin	8.38	245	248	8.6	113	1.5 cfs (M)	25-227-SW-2	08/31/93 1330	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	270 feet downgradient in Gould Creek from cabin	N/A	N/A	N/A	N/A	N/A	N/A	25-227-SE-2	08/31/93 1330	T-Metals
SE-3	SE	500 feet downgradient of SE-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
$pH \leq 5.0$	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 30 acres

Wetlands present: Yes X , No ___, Describe: Streamside and marsh

Carbonate rocks/soils: Yes ___, No X , Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X ; 100-300____; 300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 2 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: M. Babits, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR-1	None	Moist	51,750	45,540	Yes	Moderate/Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_, Describe:____

Population within 1 mile: 1-10_X_; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments____

Evidence of recreational use on site: Yes___, No_X_, Describe:____

Accessibility - Fences, warning signs, closed roads?_Unrestricted_

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment____
Wilderness Area - Yes___, No_X_, Comment____
T&E Species Habitat - Yes___, No_X_, Comment____
Bat Habitat - Yes___, No_X_, Comment____

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium___, Low_Not Rated_
Wetlands Frontage - High___, Medium___, Low_Not Rated_
Fisheries Habitat and Species Classification - _Not Rated_
Sport Fishery Classification - _Not Rated_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No_X_, Number____, types and locations:____

Hazardous structures: Yes_X_, No___, Number_1_, types and locations:_Cabin_

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations:____

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_, Number____, types and locations:____

Fire and/or Explosion hazards: Yes_X_, No___, Explain:_Wood cabin and mill demolition pile_

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Astor, Prepared by Northern Engineering and Testing, July 29, 1988.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle, 1968.

LABORATORY ANALYTICAL DATA

ASTOR
PA NO. 25-227

Astor PA# 25–227
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER – BABITS
INVESTIGATION DATE: 08/31/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25–227–SE–1	7.15	51.8 JX	1.7 J	2.47	5.41	23	6980	15.1 JX	200	3.06 J	65.7 J	6.26 UJ	103	0.314 U
25–227–SE–2	19	187 JX	3.7 J	9.12	11.4	104	21700	17.7 JX	552	13.2 J	231 J	12.5 UJ	221	0.672 U
25–227–WR–1	48.7	84.1 JX	2.0 J	8.62	3.14	80.5	28500	0.203 JX	946	3.71 J	149 J	4.88 UJ	155	NR
BACKGROUND	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
25–227–WR–1	<0.01	0	40.2	40.2	<0.01	<0.01	<0.01	0	40.2

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25–227–SW–1	7.24 J	76.3	2.57 U	9.7 U	6.83 U	9.3 J	51.7 JX	0.14	11.7	12.7 U	3.01 J	30.7 U	7.57 U	115
25–227–SW–2	13.4 J	61.9	2.57 U	9.7 U	6.83 U	11.7 J	121 JX	0.78	12.6	12.7 U	5.9 J	30.7 U	13.5	115
25–227–SW–3	16.8 J	9.8	2.57 U	9.7 U	6.83 U	1.55 U	101 JX	0.12 U	4.08 U	12.7 U	5.08 J	30.7 U	7.57 U	90.1

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2–N	CYANIDE
25–227–SW–1	139	< 5	5	< 0.05	< 0.005
25–227–SW–2	128	< 5	7	< 0.05	< 0.005
25–227–SW–3	120	< 5	6	0.09	NR

LEGEND

SE1 – Upgradient (175') in Gould Creek (mill building).
SE2 – Downgradient (270') in Gould Creek (cabin).
WR1 – Composite of subsamples WR1A, 1B, and 1C.
BACKGROUND – From SE SW Sec.10 (25–212–SS–1).

SW1 – Same as sample SE1.
SW2 – Same as sample SE2.
SW3 – Adit discharge at waste rock dump 1.

XRF ANALYSIS RESULTS

ASTOR
PA NO. 25-227

Mine Name: Astor PA# 25–227
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
25–227–SE–3			9116.33	787.729	167.962 *	382.368 *	17550.8			90.2952 *		145.014
25–227–TP1–A			43778.8	1085.6		1090.95 *	18034.5		85.56 *	251.065		87.6335
25–227–WR1–A		27448.5	11951.5	1915.62		1474.06	32612.8		135.82 *	251.131		318.433
25–227–WR1–B			25171.4	1656.59		2185.6	37484		68.9035 *	130.851 *	44.0831 *	377.655
25–227–WR1–C			14701.3	2285.47		1246.37 *	37241.5		77.8796 *	88.1489 *	85.3063 *	236.082
25–227–WR–1–COMP			12785	1937.99	153.119 *	1529.94	34914		102.841 *	171.891		242.082

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
25–227–SE–3	132.07		4.10923 *	182.351	70.6798			613.538	82.4354 *		
25–227–TP1–A	108.164			236.718	111.678		59.9251 *	576.902	123.976 *		
25–227–WR1–A	136.479		16.1605	218.02	137.655			968.388	115.809 *		
25–227–WR1–B	123.358		5.75883 *	78.1246 *	146.578			948.795	92.3922 *		
25–227–WR1–C	142.743		16.1273 *	22.5794 *	211.644			904.137			
25–227–WR–1–COMP	133.682		11.181 *	152.295	180.375			894.423	77.168 *		

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

ASTOR
PA NO. 25-227

AIMSS SCORESHEET

SITE NAME: ASTOR
PA NUMBER: 25-227

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.190
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		404
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	404.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	192304
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.451
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		0
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	17
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	9867
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		15
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	75
27		LIKELIHOOD SCORE	LINES 25 + 26C	75
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.014
29	AIR - TARGETS	POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		0
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	30
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	32
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	100
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.012
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	1
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	1
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			**2.02**

SITE NAME: ASTOR
PA NUMBER: 25-227

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	40
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	1
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**0.80**

25-227, #19: WR-1

LINCOLN

LIBBY

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: SNOWSHOE MINE **PA#:** 27-005

Date: August 4, 1993 **Time:** 1000-1600

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, Pioneer
Lasher, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm to hot.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number)**:** #1: WR-1 upper dump; #2: WR-2; #3: WR-3; #4,#5: Erosion gullies in reclaimed lower dump; #6: SW-1 and SE-1 location upgradient in Snowshoe Creek; #7: Red tailings in stream bank; #8: SW-3 location, PVC pipe discharge to Creek; #9-#11: Panorama of reclaimed dump (WR-4); #12: SW-2 location downstream in Snowshoe Creek. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms)**:** Lower adits and dumps are reclaimed. Tailings in flood plain also moved to sides and flood plain gravels planted.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Partly remediated; however, upper dumps are steep and unvegetated, unable to get equipment up slope. Several open adits need to be closed.

MDSL AMRB/PIONEER 4/9/93

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SNOWSHOE MINE PA#: 27-005

Legal Description: T 28N ;R 31W ;Sec. 7 , NE1/4 NW1/4 ___1/4

County: LINCOLN Mining District: LIBBY

Latitude: N 48° 12' 17" Longitude: W 115° 38' 42"

Primary Drainage Basin and Code: Big Cherry Creek/17010101
Secondary Drainage Basin: Snowshoe Creek

USGS Quadrangle map name(s): Snowshoe Peak

Mine Type/Commodities: Hardrock/Lead, Zinc, Silver

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): William Faulkner, 825 Goodrich Avenue, St. Paul, MN 55105; Margaret Keith, 1326 7th Avenue East, Kalispell, MT 59901.

Relationship to other mines/sites in the area/district: West-southwest of St. Paul Mine 1/2 mile.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Lower adits and dumps reclaimed by DSL; dumps spread and revegetated; 2 adits closed; under drain added. No permits known.

General site features: Elevation 4560'-5600' , Slope 40° ,
Aspect North

Land use: Mining___, Recreational X , Residential___, Urban___,
Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? 9.2 acres.
Dimensions: 2,000 feet x 200 feet

Predominant vegetation types: Cedar, spruce, willows

Access: roads - good___,poor X ,4wd X ,trail___.
Other logistical considerations (proximity to other sites).
Forest Service road and unmaintained mine access.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is located in intermittent unnamed drainage of perennial Snowshoe Creek. Adits and dumps are spread out over approx. 1/3 mile in the drainage bottom of unnamed tributary, which flows north through and past the dumps. WR-4 base is at confluence of tributary with Snowshoe Creek, which flows northeast away from the site. Site is underlain by the Snowshoe Fault. The west side of the fault is limestone of the Wallace Formation; east side is shales and sandstones of Precambrian Ravalli.

Mining/milling history, ore type/tenor, host rock, gangue: First mined in 1892; extensive work began in 1900 and smelted at that time for Pb, Ag, and Au. Total output in early years (pre 1934) was approx. 130,000 tons of ore. Gangue chiefly quartz crushed host rock and carbonate with siderite, pyrite, and galena. Ore is chiefly argentiferous galena with Au values. Average assay in 1909 was 10% Pb and 5 oz. Ag/ton. Less abundant is chalcopyrite and arsenopyrite. Grade of ore over lifetime said to average 10% Pb and 3 oz. Ag/ton. The Snowshoe vein occupies the fissure of the Snowshoe Fault. Country rock on the east side of the fault consists of grayish-green to dark gray indurated arenaceous shales and flaggy sandstones of the Burke Formation; that on the west side is a calcareous shale resembling that of the Newland Formation.

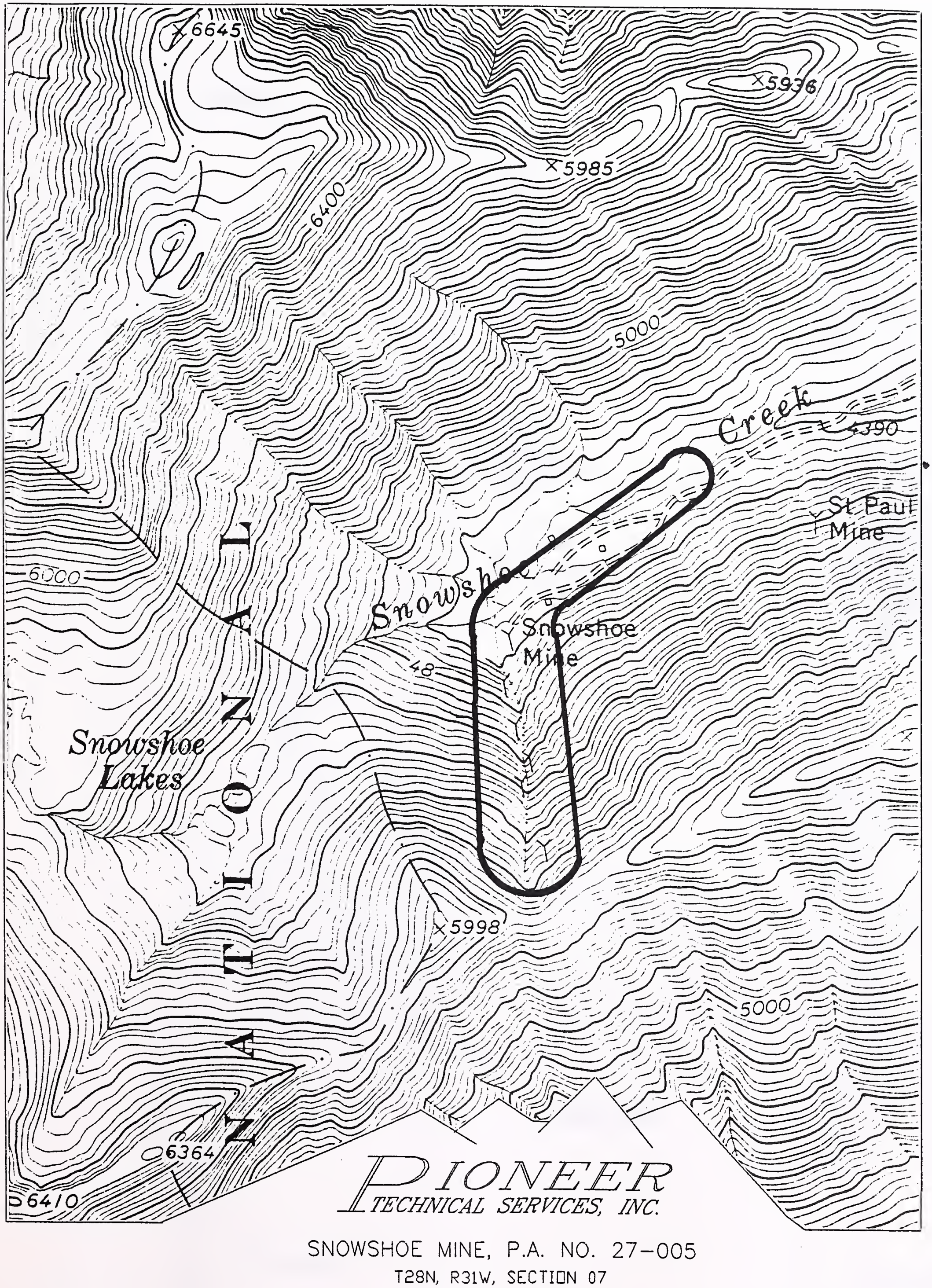
Mine Operation?
Shafts - Yes___, No X , # ____, Comment
Adits - Yes X , No___, # 6 , Comment 3 open; 3 collapsed
Pits - Yes___, No X , # ____, Comment
Placers - Yes___, No X , # ____, Comment
Other - Yes___, No X , # ____, Comment

Mill Operation? Yes X , No____. If yes answer the next three questions:

Period(s) of Operation: Discovered in 1889; operated through the early 1900's; inactive since 1964.

Origin of Ore Milled - Custom Mill___ Dedicated Mill X ; Number and names of mines that supplied mill feed: Only one local mine within a reasonable area.

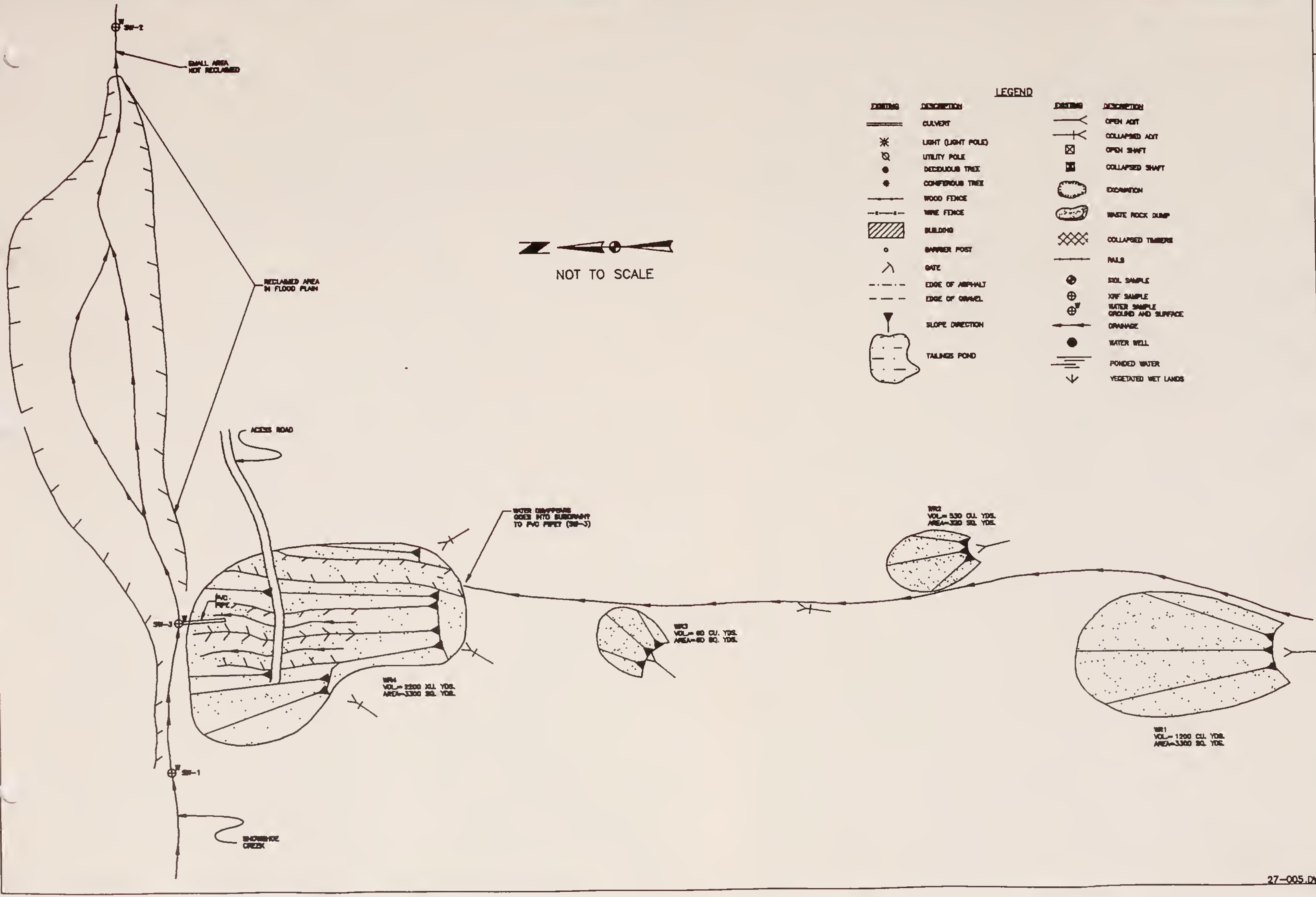
Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? Between 1900 and 1912, concentrating plant reported 225 tons. In 1940, a portable selective flotation concentrator is reported on-site which milled developed ore, mine dumps, and tailings. Prior to 1958, a 100-ton flotation mill was erected.



PIONEER TECHNICAL SERVICES, INC.

SNOWSHOE MINE, P.A. NO. 27-005

T28N, R31W, SECTION 07
SCALE: 1' = 1000'



MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY
SNOWSHOE PA# 27-005
LIBBY DISTRICT LINCOLN COUNTY

DRAWN JTP DATE 28 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED MJB F.B. NO.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.

27-005.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Tailings are not impounded; in floodplain.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: Floodplain tailings appear to have been pulled back from stream and piled at the edge of the floodplain. Vegetation is starting to become established.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	1,200	Upper dump; south	None	6.6 (D)	0.05	27-005-WR-1	08/04/93 1530	T-Metals, ABA
WR-1B	WR		Upper dump; north	None	6.8 (D)	0.04			
WR-2	WR	530	Second upper dump; north	None	6.4 (D)	0.04			
WR-3	WR	60	Third upper dump; north	None	6.6 (D)	0.04			
WR-4A	WR	2,200	Lower reclaimed dump	None	4.0 (D)	0.04			
WR-4B	WR		Lower reclaimed dump	None	< 3.5 (D)	0.05			
WR-4C	WR		Lower reclaimed dump	None	6.2 (D)	0.05			
TP-1A	TAIL	Est. 5,000	In floodplain near base of mines	None	NM	NM	27-005-TP-1	08/04/93 1445	T-Metals, ABA
SS-1	BKGRND	N/A	Background soil east of site	None	N/A	N/A	27-005-SS-1	08/04/93 1420	T-Metals

* D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 27-005-WR-1 is composite of WR-1A and -1B, WR-2, and WR-3. NM = Not Measured.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X , Number:_____ Identification: Possible trickle out of adits, but may be surface water.

Filled shafts: Yes___, No X , Number:____ Identification:______________

Seeps/Springs: Yes___, No X , Number:____ Identification:______________

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 8

Distance to nearest well used for drinking? There is a hunting cabin located 2.5 miles to the east of the site.

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely X .
Steep slopes; carbonates

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X , No ___, Name(s): Snowshoe Creek

Dry streambeds: Yes X , No ___, Name(s): Adits are along an unnamed tributary with a trickle running through parts.

Other surface water: Yes ___, No X , Name(s)/Description:

Waste materials within any floodplain: Yes X , No ___ Source ID(s): TP-1; some tailings are still in floodplain.

Approximate Flood frequency? X 1 yr, ___10 yr, ___100 yr

Estimated seasonal flow of stream(s) (cfs)? 4 during investigation
High Flow: 6 cfs , Average Flow: 3 cfs

Distance between waste source(s) and nearest surface water body (ft)? 2 feet; tailings are along creek.

Surface water draining onto or through waste sources: Yes ___, No X ,
Describe: Runoff only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands, fishery, and recreation downstream in Big Cherry Creek.

Observed erosional/sedimentation/stream turbidity problems? Yes X , No ___, Distance downstream (ft)? 1000 Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):
Tailings are deposited along floodplain downstream.

SURFACE WATER INVENTORY FORM

SAMPLERS: Tuesday, Lasher

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Upstream of mine in Snowshoe Creek	7.12	106	NM	15.4	44	4 cfs (E)	27-005-SW-1	08/04/93 1430	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	Upgradient of mine in Snowshoe Creek	N/A	N/A	N/A	N/A	N/A	N/A	27-005-SE-1	08/04/93 1430	T-Metals
SW-2	SW	Downstream of mine and most floodplain tailings	7.36	133	NM	16.9	43	10 gpm (E)	27-005-SW-2	08/04/93 1545	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	Downstream of mine and most floodplain tailings	N/A	N/A	N/A	N/A	N/A	N/A	27-005-SE-2	08/04/93 1545	T-Metals
SW-3	SW	Discharge from PVC pipe from under dump	6.65	166	NM	8.0	67	NM	27-005-SW-3	08/04/93 1445	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = Not Measured

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 4 acres in flood plain; none on hillside.

Wetlands present: Yes___, No X , Describe:

Carbonate rocks/soils: Yes X , No___, Describe: Carbonate minerals reported in gangue and carbonaceous rocks reported as host rock (foot wall).

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 X ; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? Hunting cabin, 2.5 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Lasher

SOURCE I.D. NO.	**ACID MINE DRAINAGE CHARACTERISTICS** (LIST)	**MOISTURE CONTENT** (WET/DRY/PARTIAL)	**SURFACE AREA** (SQUARE FEET)	**UNCOVERED/UNVEGETATED AREA** (SQUARE FEET)	**AVAILABLE FINES** (YES/NO)	**DUST PROPAGATION POTENTIAL** (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	Sulfides; FEOX	Dry	29,700	29,700	Yes	Low
WR-2	Sulfides; FEOX	Dry	2,880	2,880	Yes	Low
WR-3	Sulfides; FEOX	Dry	540	540	Yes	Low
WR-4	Sulfides; FEOX	Dry	29,700	5,940	Yes	Low
TP-1	FEOX	Dry	Est. 45,000	Est. 45,000	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X__,
Describe:____

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments_None____

Evidence of recreational use on site: Yes_X_, No___, Describe:_______
Campfire rings_______________________________________

Accessibility - Fences, warning signs, closed roads?_Unrestricted___
____

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment_______________
Wilderness Area - Yes___, No_X_, Comment_______________
T&E Species Habitat - Yes_X_, No___, Comment_Grizzly Bear_______
Bat Habitat - Yes___, No_X_, Comment_______________

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium_X_, Low___
Fisheries Habitat and Species Classification - _4_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_3__, types and locations:___
Adits on upper three dumps are partially open.________________
____

Hazardous structures: Yes___, No_X_, Number____, types and locations:_
____
____

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____,
types and locations:___________________________________
____
____

Unstable waste piles, impoundments, undercut banks: Yes_X_, No____,
Number____, types and locations:_Waste piles are very steep._______
____
____

Fire and/or Explosion hazards: Yes___, No_X_, Explain:______________
____
____

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LABORATORY ANALYTICAL DATA

SNOWSHOE
PA NO. 27-005

MDSL AMRB/PIONEER 4/9/93

Snowshoe PA# 27-005
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER – TUESDAY
INVESTIGATION DATE: 08/04/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
27–005–SE–1	17.2 J	12.5	1.09	5.63	1.46	10.1	15700	0.039	308	5.2	21.4	6.29 U	45.5	NR
27–005–SE–2	1350 J	6.45	115	7.82	1.78	226	78700	0.037	4580	5.4	8320	32.2	9270	NR
27–005–TP–1	3840 J	4.91	142	5.52	1.58 U	664	98200	0.4	1150	2.93 U	44300	109	11700	NR
27–005–WR–1	3230 J	7.58	81.8	8.44	1.73	545	64400	1.11	1120	6.16	59300	120	6530	NR
BACKGROUND	54.2 J	18.5	1.23	9.23	1.59 U	29.4	21400	0.060	475	11.8	198	7.15 U	213	NR

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision: NR – Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
27–005–TP–1	1.62	50.6	3.74	–46.9	0.09	1.23	0.30	38.4	–34.7
27–005–WR–1	1.71	53.4	15.5	–37.9	0.18	0.55	0.98	17.2	–1.67

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
27–005–SW–1	0.987 J	2.97	2.57 U	9.7 U	6.83 U	1.67	35.1 J	0.180 JX	4.08 U	12.7 U	1.22 U	30.7 U	7.57 U	39.1
27–005–SW–2	4.43 J	4.63	14	9.7 U	6.83 U	2.77	45.2 J	0.210 JX	48.1	12.7 U	60.7 J	30.7 U	1030 J	41.7
27–005–SW–3	9.06 J	4.47	61.5	9.7 U	6.83 U	4.97	191 J	0.220 JX	175	12.7 U	82.3 J	30.7 U	5940 J	98.5

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision: NR – Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2–N	CYANIDE
27–005–SW–1	55	< 5.0	< 5.0	0.07	NR
27–005–SW–2	53	< 5.0	8	0.1	NR
27–005–SW–3	152	< 5.0	42	0.07	NR

LEGEND

SE1 – Upgradient of mine in Snowshoe Creek.	SW1 – Same as sample SE1.
SE2 – Downstream of mine and most floodplain tailings.	SW2 – Same as sample SE2.
TP1 – In floodplain near base of mines.	SW3 – Discharge from pipe under dump.
BACKGROUND – From Snowshoe Mine (27–005–SS–1).	

XRF ANALYSIS RESULTS

SNOWSHOE
PA NO. 27-005

MDSL AMRB/PIONEER 4/9/93

Mine Name: Snowshoe PA# 27-005
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
27-005-SS-1			1938.43	2042.77		562.171 *	24390.8		47.1839 *	223.879	61.4438 *	18.1634
27-005-TP1-A	566.373 *		1604.76	1249.63		1159.44 *	93345.5		542.423	6424.67	926.913 *	33.3979 *
27-005-WR1-A	419.99 *		1210.32	714.816		3239.07	108459		534.48	3741.75		49.6514 *
27-005-WR1-B	466.961 *		965.533	604.823		1252.46 *	88952.2		633.049	2328.47	2148.47	56.6203
27-005-WR4-A			5169.06	1321.28		342.672 *	57015.5		176.967 *	1570.63	1391.1	114.76
27-005-WR4-B			1849.04	1107.11		637.409 *	85124.6		271.552	2436.17	2306.87	18.9621 *
27-005-WR4-C			1496.06	545.19		528.012 *	89533.7		252.844	1746.9	4738.4	23.7316 *
27-005-WR4-C-DUP			1469.53	688.624		706.979 *	89819.8		251.363	1704.27	4626.92	24.0934 *
27-005-WR-1-COMP			1307.77	1049.23		1694.67	64389.3		486.809	2308.86	1390.67	32.9142 *
27-005-WR-2			1781.98	1865.87		3327.23	38653.3		334.512	4143.96		39.1207 *
27-005-WR-3	486.684 *		1618.79	2106.9		857.727 *	44059.8		557.904	1082.54	3748.64	27.5234 *

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
27-005-SS-1	247.685			180.064	141.952			438.331			14.5735 *
27-005-TP1-A	133.524			23914.9	92.7014		113.265 *	126.859	247.851 *		
27-005-WR1-A	122.456			27811.2	69.361 *	306.729 *	129.855 *	105.379	272.495 *		
27-005-WR1-B	83.3315			34652.8	56.36 *	381.017 *	98.2205 *	105.195	205.286 *		
27-005-WR4-A	182.988			5295.84	81.6883			363.917	118.062 *		
27-005-WR4-B	152.673			9738.51	97.1087			240.063			
27-005-WR4-C	155.029			16295.6	138.306			446.435	180.777 *		
27-005-WR4-C-DUP	150.514			16362.3	132.732			414.032	137.207 *		
27-005-WR-1-COMP	151.067			24097.6	127.957	229.158 *		264.608	188.303 *		50.3953 *
27-005-WR-2	297.987	75.1765 *		33946.7	176.304	450.79 *		401.791	149.258 *		50.5696 *
27-005-WR-3	234.583			13910.2	202.456	302.083 *		468.082	169.527 *		37.6595 *

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

SNOWSHOE
PA NO. 27-005

AIMSS SCORESHEET

SITE NAME: SNOWSHOE MINE
PA NUMBER: 27-005

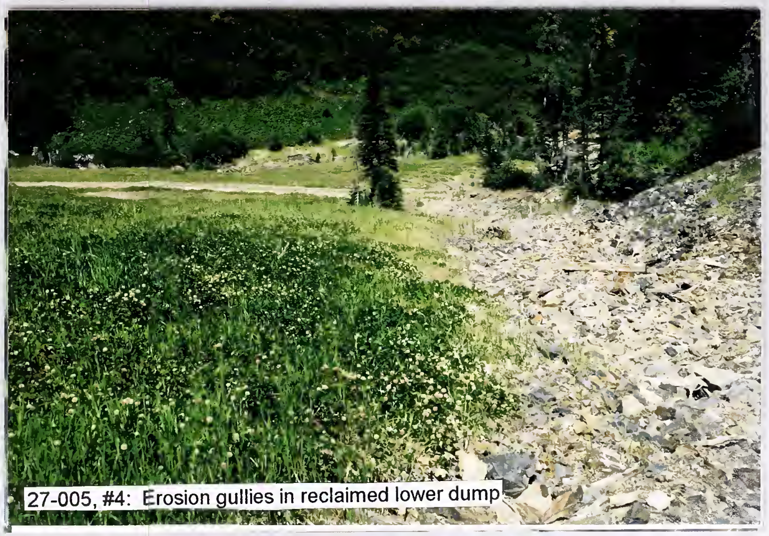
LINE NO.				
		GROUNDWATER PATHWAY		
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	331.863
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		8
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	8.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	530981
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		100
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	800
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	363.363
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19	SW - TARGETS	FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		0
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	22
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	6395189
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		10
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	12.112
29		POPULATION - 4 MILES		1
30		NEAREST RESIDENCE		0
31	AIR - TARGETS	WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	16
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	9690
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	11.062
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		0
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		2
43		TARGETS SCORE	SUM LINES 40 THRU 42	2
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	3319
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		**69.39**

			SITE NAME:	SNOWSHOE MINE
			PA NUMBER:	27-005
LINE NO.		**SITE SAFETY**		
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	150
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	150
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		2
12		TARGETS SCORE	SUM LINES 9 THRU 11	2
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**6.00**

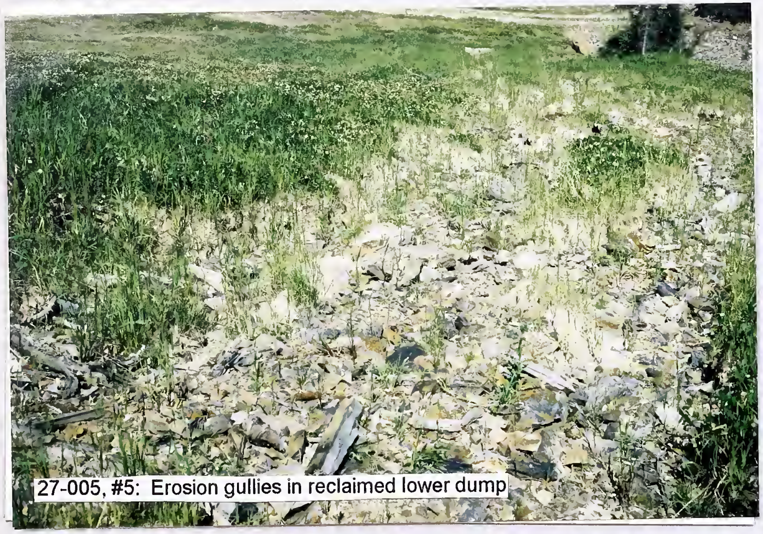
27-005, #1: WR-1 (upper dump)

27-005, #2: WR-2

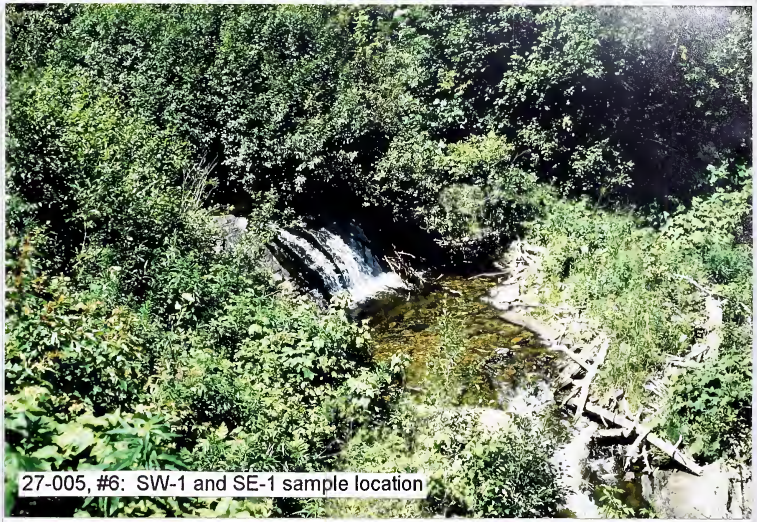
27-005, #3: WR-3



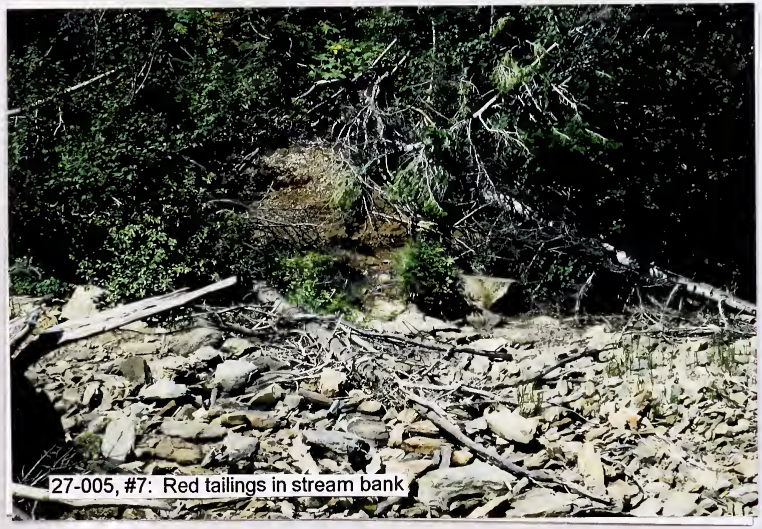
27-005, #4: Erosion gullies in reclaimed lower dump



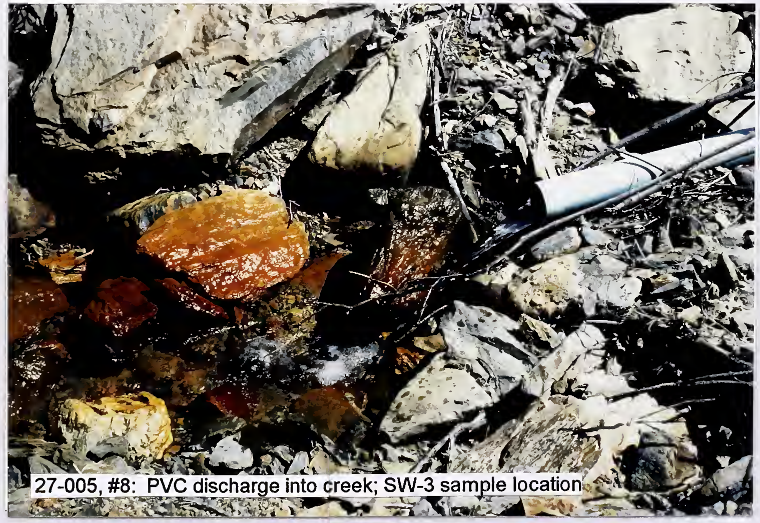
27-005, #5: Erosion gullies in reclaimed lower dump



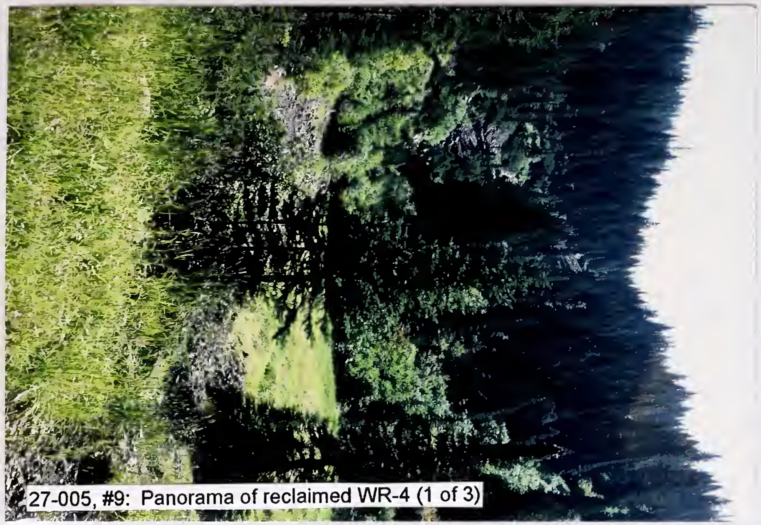
27-005, #6: SW-1 and SE-1 sample location



27-005, #7: Red tailings in stream bank



27-005, #8: PVC discharge into creek; SW-3 sample location


27-005, #9: Panorama of reclaimed WR-4 (1 of 3)

27-005, #10: Panorama of reclaimed WR-4 (2 of 3)

27-005, #11: Panorama of reclaimed WR-4 (3 of 3)

27-005, #12: SW-2 and SE-2 sample location

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: CHERRY CREEK MILLSITE PA#: 27-006

Date: August 4, 1993 Time: 1700-1930

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, Pioneer
Lasher, Pioneer

Visitors: None

Weather/Seasonality Observations: Hot; sunny.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #13: Reclaimed tailings south; #14: Mill foundation; #15: Reclaimed tailings north. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Access to site by truck.

Other Hazardous Materials/Substances Present:

General Comments on Potential Remedial Alternatives: Revegetate unvegetated tailings and mill area; site is mostly reclaimed and revegetated.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CHERRY CREEK MILLSITE PA#: 27-006

Legal Description: T 29N ;R 31W ;Sec. 27 , SE1/4NW 1/4 ___ 1/4

County: LINCOLN Mining District: LIBBY

Latitude: N 48° 14' 42" Longitude: W 115° 32' 50"

Primary Drainage Basin and Code: Libby Creek/17010101
Secondary Drainage Basin: Big Cherry Creek

USGS Quadrangle map name(s): Cable Mountain

Mine Type/Commodities: Millsite/Unknown

Activity Status: Active ___, Inactive/Exploration ___, Abandoned X .

Ownership status: Known Y X N ___; private/public? Public
Owner, Agent, or Contact (Include address and phone when available): Kootenai National Forest.

Relationship to other mines/sites in the area/district: No immediate mine sites in relationship to this site. Snowshoe mine is located greater than three miles farther up the road.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Site has been mostly reclaimed.

General site features: Elevation 3000', Slope 5°-15°,
Aspect Northwest

Land use: Mining ___, Recreational X , Residential ___, Urban ___, Agricultural ___, Other(Specify) ___

Area of disturbed/unvegetated lands? 1.5 acres.
Dimensions: 300 feet x 200 feet

Predominant vegetation types: Clover and grasses on tailings (revegetated); Lodgepole pine

Access: roads - good X , poor ___, 4wd ___, trail ___.
Other logistical considerations (proximity to other sites). ___

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on the southeast side of perennial Big Cherry Creek which flows northeast past the site to its confluence with Libby Creek nine miles below the site.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment Reported, but not located

Adits - Yes___, No X, # ____, Comment

Pits - Yes___, No X, # ____, Comment

Placers - Yes___, No X, # ____, Comment

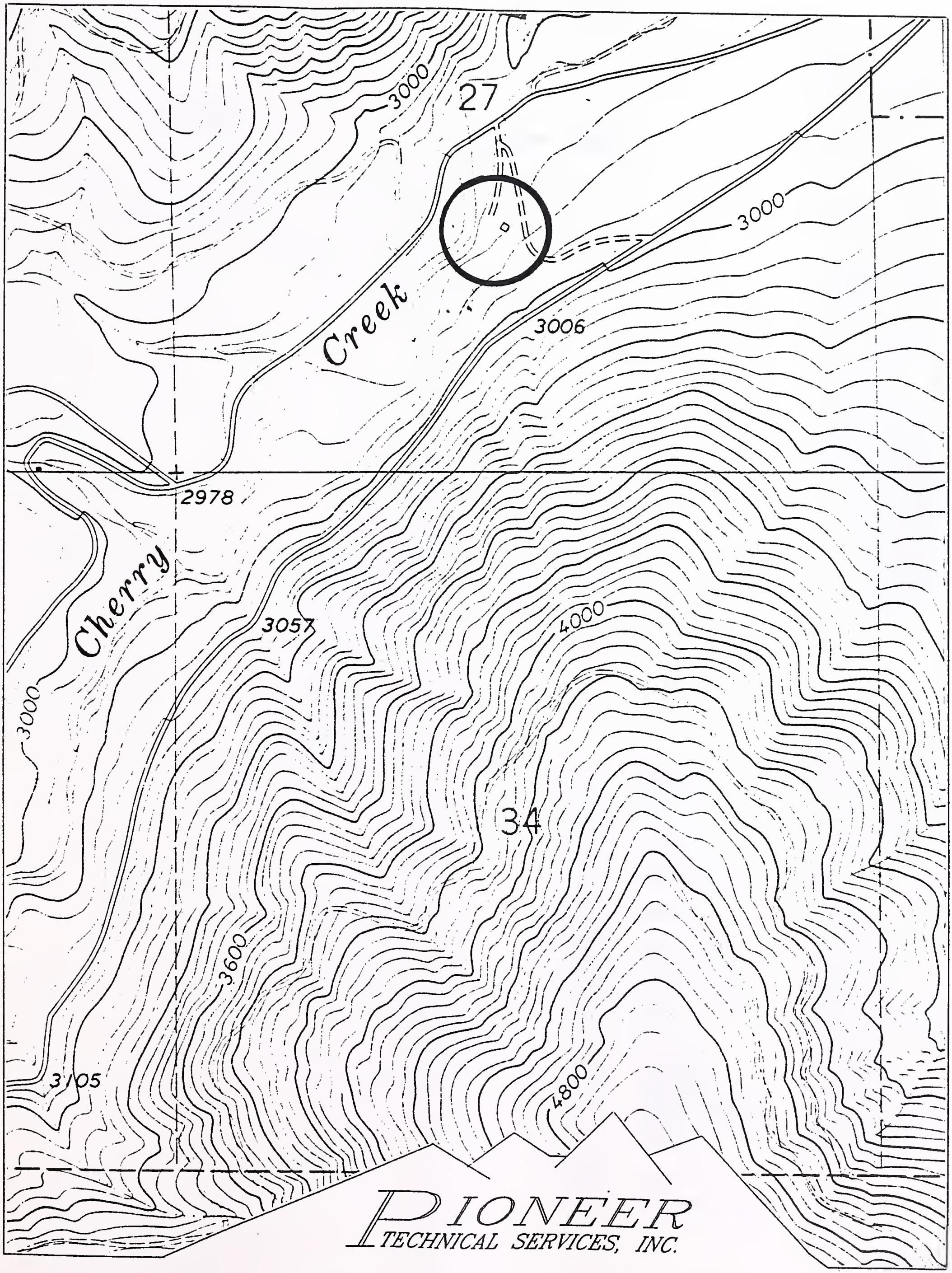
Other - Yes___, No X, # ____, Comment

Mill Operation? Yes X, No____. If yes answer the next three questions:

Period(s) of Operation: Unknown

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? Floatation

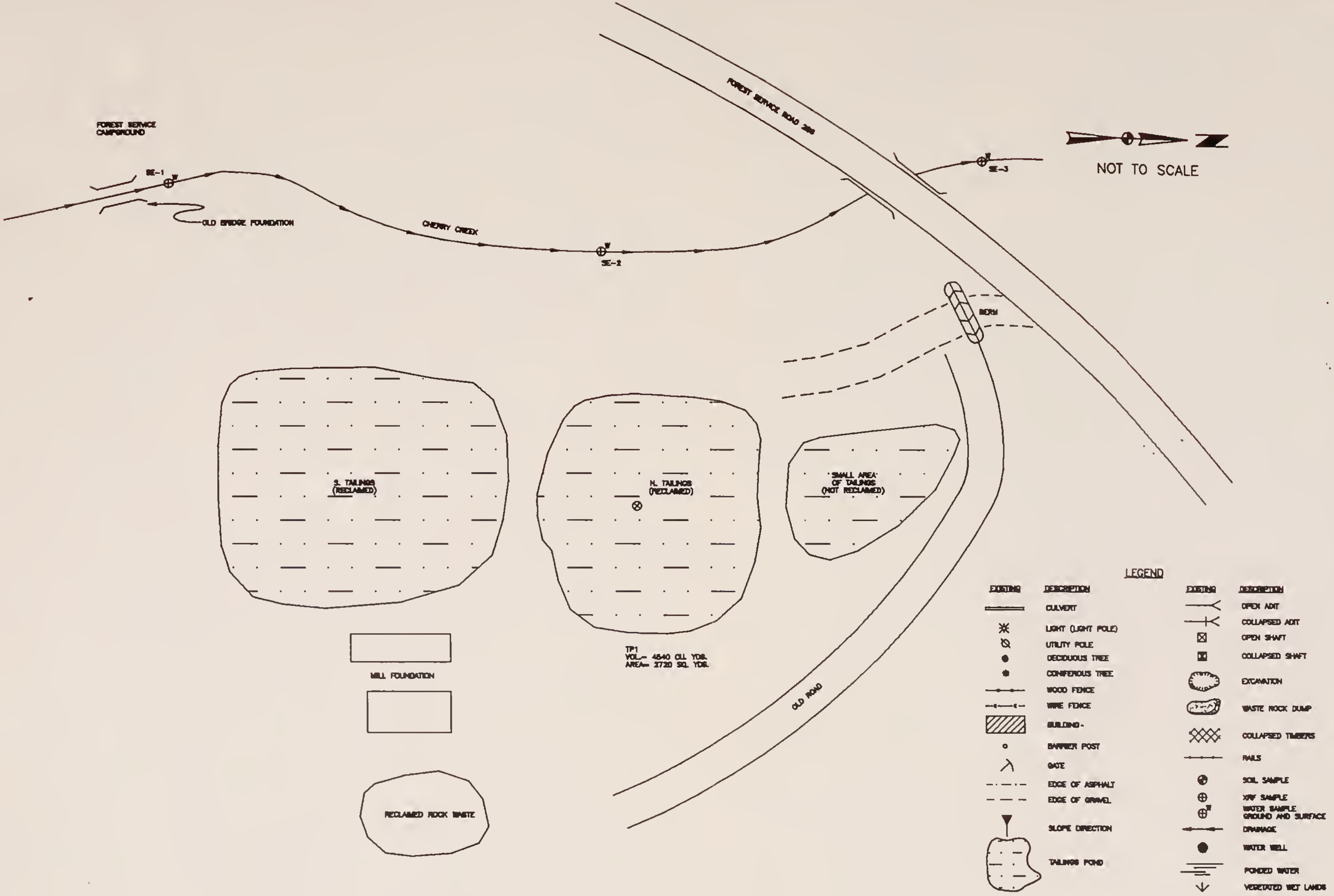


PIONEER
TECHNICAL SERVICES, INC.

CHERRY CREEK MILL, P.A. NO. 27-006

T29N, R31W, SECTION 27

SCALE: 1" = 1000'



MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

CHERRY CREEK MILL PA# 27-006
LIBBY DISTRICT LINCOLN COUNTY

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

TDH

DRAWN JTP DATE 28 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

SHEET NO.

27-006.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. **TAILINGS IMPOUNDMENTS** - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Difficult to distinguish; the site was reclaimed and tailings are covered and revegetated.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Some tailings/dirt berms are approx. 5 feet deep. Stratification not observable.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Impoundments intact; moderate to well vegetated.

Comments on potential for mitigation: Reclamation has already taken place; stabilize berms of tailings with native soil/gravel.

SOURCE INVENTORY FORM

SAMPLERS: Lasher

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A-A	TAIL	4,540	Cap material on north end of tailings	Reclaimed and revegetated	6.5 (D)	0.03	N/A	N/A	N/A
TP-1A-B	TAIL		North end of pond	Reclaimed and revegetated	5.4 (D)	0.045	27-006-TP-1	08/04/93 1847	T-Metals, ABA

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: Subsample TP-1A-A is a "cap" to the tailings. See Snowshoe Mine (27-005) for background soil sample.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:____________

Filled shafts: Yes___, No_X_, Number:____ Identification:____________

Seeps/Springs: Yes___, No_X_, Number:____ Identification:____________

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs: 313

Distance to nearest well used for drinking? 2.5 miles to residence along Hwy. 2 northeast of site.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely_X_.
Tailings are capped and well vegetated; relatively high pH with moderate metals concentrations.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Big Cherry Creek

Dry streambeds: Yes ___, No X, Name(s):

Other surface water: Yes ___, No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No ___ Source ID(s): TP-1

Approximate Flood frequency? ___1 yr, ___10 yr, X 100 yr

Estimated seasonal flow of stream(s) (cfs)? 30 during investigation
High Flow: 300 cfs, Average Flow: 30 cfs

Distance between waste source(s) and nearest surface water body (ft)? 50 feet from revegetated TP-1 to Big Cherry Creek.

Surface water draining onto or through waste sources: Yes ___, No X,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Recreational use for camp site across creek from site; fishing, recreation, wetlands downstream.

Observed erosional/sedimentation/stream turbidity problems? Yes ___, No X, Distance downstream (ft)? ___ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):
None observed during this investigation.

SURFACE WATER INVENTORY FORM

SAMPLERS: Belanger

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SE-1	SE	Upgradient on Cherry Creek	N/A	N/A	N/A	N/A	N/A	30 cfs (E)	27-006-SE-1	08/04/93 1820	T-Metals
SE-2	SE	PPE to Cherry Creek	N/A	N/A	N/A	N/A	N/A	N/A	27-006-SE-2	08/04/93 1800	T-Metals
SE-3	SE	Downgradient on Cherry Creek	N/A	N/A	N/A	N/A	N/A	N/A	27-006-SE-3	08/04/93 1745	T-Metals

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? The area has already been mostly reclaimed.

Wetlands present: Yes___, No X , Describe:

Carbonate rocks/soils: Yes___, No X , Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X ; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 2.5 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Belanger

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1	None	Dry	24,500	3,500	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:

Population within 1 mile: 1-10 X ; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments

Evidence of recreational use on site: Yes X , No___, Describe:
Camping; shooting

Accessibility - Fences, warning signs, closed roads? Road is barricaded by a berm, but easy access on foot; across river from campground.

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No X , Comment
Wilderness Area - Yes___, No X , Comment
T&E Species Habitat - Yes X , No___, Comment Grizzly
Bat Habitat - Yes___, No X , Comment

Primary Drainage___; Secondary Drainage X ; No Information___:

Riparian Habitat Quality - High___, Medium X , Low___
Wetlands Frontage - High___, Medium X , Low___
Fisheries Habitat and Species Classification - 4
Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No X , Number____, types and locations:

Hazardous structures: Yes___, No X , Number____, types and locations:

Unstable highwalls, pits, trenches, slopes: Yes___, No X , Number____, types and locations:

Unstable waste piles, impoundments, undercut banks: Yes____, No X , Number____, types and locations:

Fire and/or Explosion hazards: Yes___, No X , Explain:

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Cherry Creek Mill, Prepared by Northern Engineering and Testing, May 21, 1987.

USGS, Topographic Map, Cable Mountain, Montana, 7 1/2 minute Quadrangle, 1966.

LABORATORY ANALYTICAL DATA

CHERRY CREEK MILLSITE
PA NO. 27-006

Cherry Creek Mill PA# 27−006
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER − TUESDAY
INVESTIGATION DATE: 08/04/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
27−006−SE−1	143 J	19.3	6.43	5.89	3.19	22.7	20500	0.020	777	9.55	795	6.82	616	NR
27−006−SE−2	470 J	22.4	15.4	7.44	3.49	33.8	62000	0.029	2720	8.07	1740	7.51	1150	NR
27−006−SE−3	199 J	16.7	8.57	5.12	2.79	42.7	40100	0.024	1790	7.11	1180	6.73 U	822	NR
27−006−TP−1	546 J	35.7	22.5	4.12	2.62	399	30300	0.89	384	5.39	10500	39.2	5780	0.867
BACKGROUND	54.2 J	18.5	1.23	9.23	1.59 U	29.4	21400	0.060	475	11.8	198	7.15 U	213	NR

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
27−006−TP−1	0.30	9.37	2.09	−7.28	0.14	0.11	0.05	3.44	−1.34

LEGEND
SE1 − Upgradient on Cherry Creek.
SE2 − PFE to Cherry Creek.
SE3 − Downgradient on Cherry Creek.
TP1 − Sample of the subsample TP1A−B.
BACKGROUND − From the Snowshoe Mine (27−005−SS−1).

XRF ANALYSIS RESULTS

CHERRY CREEK MILLSITE
PA NO. 27-006

MDSL AMRB/PIONEER 4/9/93

Mine Name: Cherry Creek Mill PA# 27–006
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
27–006–TP1A–A		14760.2	10692.4	2366.37			16973.5				35.126 *	267.361
27–006–TP1A–B		15206.1	2656.4	1333.35			31582.5	275.447 *	338.504	3979.28		56.0055

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
27–006–TP1A–A	273.278				53.6057			491.357			7.98138 *
27–006–TP1A–B	158.045			6345.01	93.1123	186.713 *		345.611			

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

CHERRY CREEK MILLSITE
PA NO. 27-006

AIMSS SCORESHEET

SITE NAME: CHERRY CREEK MILL
PA NUMBER: 27-006

LINE NO.				
		GROUNDWATER PATHWAY		
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		5
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	100
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	100
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	32.564
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		313
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	313.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	1019253
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		10
13B		DISTANCE TO SW		10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	100
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	35.719
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19	SW - TARGETS	FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		0
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	21
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	300040
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		10
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.119
29		POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		0
31	AIR - TARGETS	WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	45
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	268
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.109
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		5
43		TARGETS SCORE	SUM LINES 40 THRU 42	6
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	98
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		**13.20**

SITE NAME: CHERRY CREEK MILL
PA NUMBER: 27-006

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	6
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**0.00**

27-006, #13: Red tailings, facing south

27-006, #14: Mill foundation

27-006, #15: Red tailings, facing north

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: MITCHELL CREEK PA#: 27-055

Date: August 4, 1993 Time: 0925

Field Team Leader: Bullock, Pioneer

Sampling Personnel: Flammang, Pioneer
Clark, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; calm; 70°F; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #22: Adit portal; #23: WR-1A and -1B sample location. Video Tape No. 5

General Comments/Observations (not covered specifically in attached Inventory Forms): There is a adit located just off of Hwy. 37.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Close adit.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): MITCHELL CREEK PA#: 27-055

Legal Description: T 31N ;R 31W ;Sec. 25 , SW1/4 SE1/4 ___1/4

County: LINCOLN Mining District: LIBBY

Latitude: N 48° 24' 57" Longitude: W 115° 29' 55"

Primary Drainage Basin and Code: Kootenai River/17010101
Secondary Drainage Basin: None

USGS Quadrangle map name(s): Vermiculite Mountain

Mine Type/Commodities: Hardrock/Unknown

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): Wayne Yarger, 2986 Highway 37, Libby, MT 59923. (406) 293-5715; Walter Rucinski, 1837 E. 171st Place, South Holland, IL 60473; Kootenai National Forest.

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 2180' , Slope 10° , Aspect Southeast

Land use: Mining___, Recreational___, Residential X , Urban___, Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? 0.01 acres.
Dimensions: 30 feet x 24 feet

Predominant vegetation types: Grasses, roses, snowberry, chokecherries, Ponderosa pine, Douglas fir

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites).
Located off of Hwy. 37

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 111 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies approx. 1/4 mile away from the Kootenai River on the north side. The river flows to the west past the site.

Mining/milling history, ore type/tenor, host rock, gangue: Host rock is quartzite; no other information available.

Mine Operation?
Shafts - Yes____, No X , # ____, Comment
Adits - Yes X , No____, # 1 , Comment Open
Pits - Yes____, No X , # ____, Comment
Placers - Yes____, No X , # ____, Comment
Other - Yes____, No X , # ____, Comment

Mill Operation? Yes____, No X . If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting?
N/A

Montana Bureau of Mines and Geology
Water Well Log Data

11/10/1993

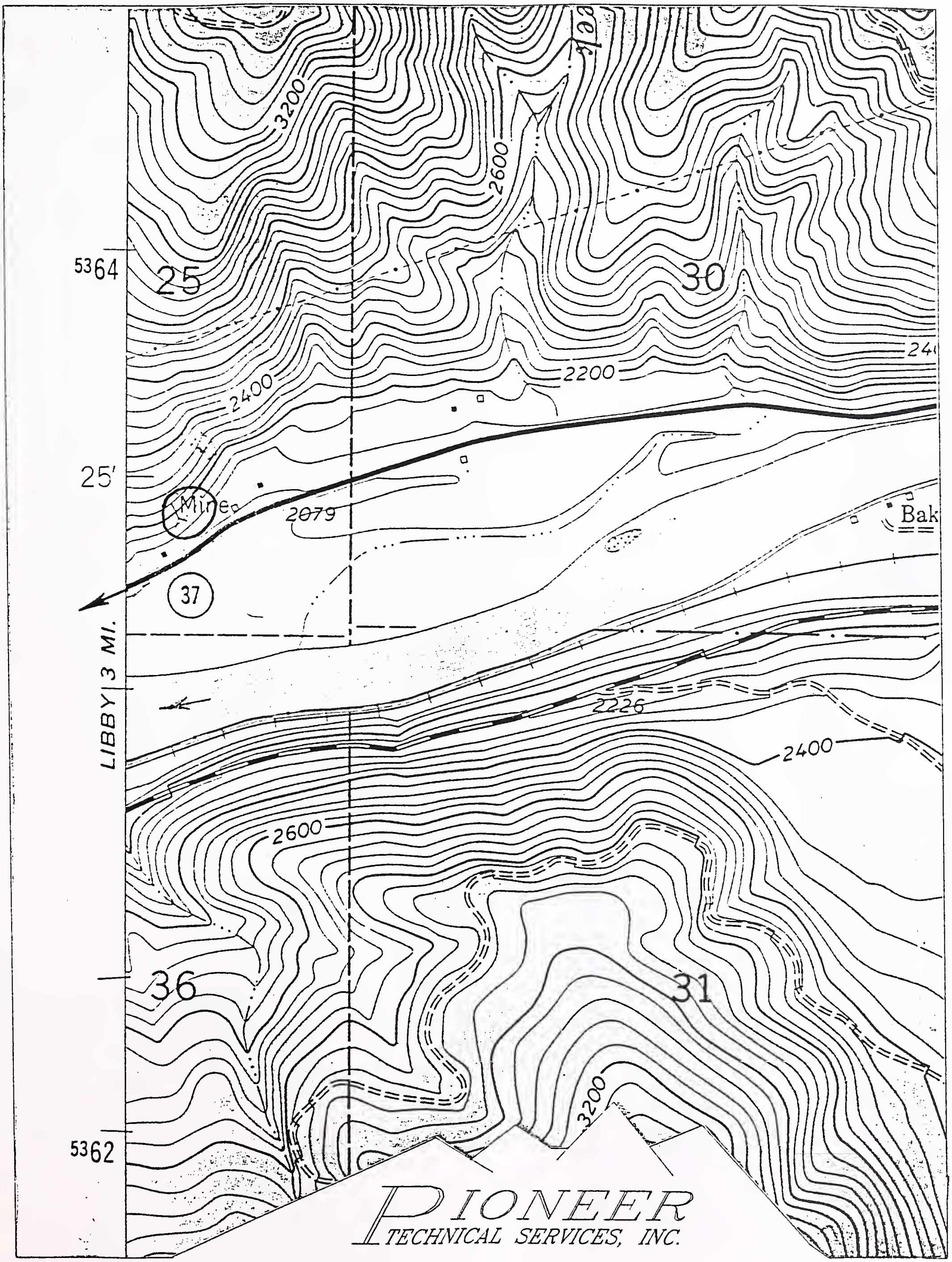
ll No.	Location	Depth	Yield	Static Water Level
M:88292	31N 31W 23 DDD	56.0	10.0	20.00
M:88302	31N 31W 25 AAA	58.0	15.0	45.00
M:88303	31N 31W 25 ACB	209.0	8.0	164.00
M:88305	31N 31W 25 CC	208.0	10.0	179.00
M:121038	31N 31W 25 CC	20.0	0.0	0.00
M:88306	31N 31W 25 DD	38.0	30.0	16.00
M:88307	31N 31W 26 BBA	490.0	5.0	204.00
M:88308	31N 31W 26 BBB	235.0	10.0	163.00
M:88309	31N 31W 26 BBD	540.0	4.0	195.00
M:88310	31N 31W 26 BC	79.0	10.0	67.00
M:88311	31N 31W 26 BCA	450.0	5.0	360.00
M:88312	31N 31W 26 BCC	270.0	12.0	226.00
M:88313	31N 31W 26 BCCC	273.0	5.0	259.00
M:88314	31N 31W 26 BDC	281.0	9.0	262.00
M:88315	31N 31W 26 CAC	280.0	9.0	258.00
M:88318	31N 31W 26 CB	275.0	12.0	255.00
M:88319	31N 31W 26 CB	74.0	15.0	66.00
M:88317	31N 31W 26 CB	66.0	5.0	60.00
M:88316	31N 31W 26 CB	67.0	15.0	60.00
M:88322	31N 31W 26 CBB	71.0	15.0	0.00
M:88324	31N 31W 26 CBB	283.0	20.0	254.00
M:88323	31N 31W 26 CBB	268.0	9.0	254.00
M:88321	31N 31W 26 CBB	272.0	10.0	250.00
88325	31N 31W 26 CBBA	65.0	7.0	58.00
88326	31N 31W 26 CBBD	65.0	5.0	61.90
:121046	31N 31W 26 D	100.0	0.0	0.00
M:88327	31N 31W 26 D	287.0	10.0	247.00
M:88328	31N 31W 26 DA	46.0	6.0	9.00
M:88329	31N 31W 26 DB	303.0	10.0	240.00
M:122815	31N 31W 26 DBC	315.0	10.0	0.00
M:88333	31N 31W 26 DC	280.0	0.0	260.00
M:88330	31N 31W 26 DC	290.0	10.0	278.00
M:88332	31N 31W 26 DC	270.0	10.0	247.00
M:88331	31N 31W 26 DC	272.0	10.0	255.00
M:88334	31N 31W 26 DCA	280.0	10.0	160.00
M:88337	31N 31W 26 DD	273.0	9.0	256.00
M:124786	31N 31W 26 DD	275.0	12.0	245.00
M:88336	31N 31W 26 DD	100.0	7.0	140.00
M:88335	31N 31W 26 DD	69.0	300.0	8.00
M:121053	31N 31W 35	62.0	10.0	40.00
M:88548	31N 31W 35	269.0	15.0	244.00
M:88549	31N 31W 35	51.0	12.0	36.00
M:88550	31N 31W 35	145.0	0.0	118.00
M:88554	31N 31W 35	221.0	10.0	197.00
M:88546	31N 31W 35	42.0	0.0	28.00
M:121052	31N 31W 35	42.0	15.0	7.00
M:88551	31N 31W 35	100.0	15.0	75.00
M:88547	31N 31W 35	67.0	10.0	52.00
:88553	31N 31W 35	168.0	12.0	153.00
88545	31N 31W 35	48.0	10.0	25.00
38552	31N 31W 35	160.0	30.0	100.00
M:88558	31N 31W 35 AA	95.0	10.0	78.00
M:88559	31N 31W 35 AA	101.0	15.0	78.00
M:88555	31N 31W 35 AA	110.0	20.0	86.00
M:88557	31N 31W 35 AA	99.0	10.0	78.00

M:88556	31N 31W 35 AA	95.0	6.0	80.00
M:88560	31N 31W 35 AAA	108.0	20.0	82.00
M:127397	31N 31W 35 AAA	247.0	15.0	208.00

Montana Bureau of Mines and Geology
Water Well Log Data

11/10/1993

ll No.	Location	Depth	Yield	Static Water Level
M:88561	31N 31W 35 AAC	91.0	10.0	21.00
M:88562	31N 31W 35 AAD	98.0	20.0	86.00
M:88563	31N 31W 35 AB	80.0	20.0	58.00
M:88564	31N 31W 35 ABB	240.0	10.0	180.00
M:88565	31N 31W 35 ABB	245.0	10.0	228.00
M:88566	31N 31W 35 ABB	100.0	25.0	75.00
M:88568	31N 31W 35 ABC	239.0	15.0	190.00
M:88570	31N 31W 35 ABC	207.0	15.0	160.00
M:88567	31N 31W 35 ABC	238.0	15.0	205.00
M:88569	31N 31W 35 ABC	211.0	20.0	192.00
M:130657	31N 31W 35 ABD	203.0	15.0	178.00
M:88571	31N 31W 35 AC	100.0	10.0	85.00
M:88572	31N 31W 35 ACD	105.0	15.0	0.00
M:88573	31N 31W 35 AD	105.0	15.0	80.00
M:88576	31N 31W 35 BB	264.0	15.0	242.00
M:88577	31N 31W 35 BB	239.0	15.0	222.00
M:88574	31N 31W 35 BB	240.0	10.0	220.00
M:88578	31N 31W 35 BB	226.0	15.0	208.00
M:88575	31N 31W 35 BB	249.0	15.0	227.00
M:120932	31N 31W 35 BDC	116.0	25.0	85.00
M:88583	31N 31W 35 CA	59.0	20.0	35.00
M:88584	31N 31W 35 CA	51.0	30.0	32.00
M:88581	31N 31W 35 CA	65.0	15.0	43.00
M:88582	31N 31W 35 CA	70.0	15.0	48.00
88579	31N 31W 35 CA	55.0	25.0	25.00
:88580	31N 31W 35 CA	59.0	20.0	35.00
M:88585	31N 31W 35 CAB	104.0	18.0	77.00
M:88587	31N 31W 35 CAC	59.0	15.0	38.00
M:88586	31N 31W 35 CAC	63.0	20.0	32.00
M:88588	31N 31W 35 CAD	60.0	20.0	35.00
M:88590	31N 31W 35 CBA	106.0	18.0	86.00
M:88591	31N 31W 35 CBC	100.0	75.0	72.00
M:88592	31N 31W 35 CCA	90.0	35.0	39.00
M:88593	31N 31W 35 DAA	39.0	30.0	10.00
M:88594	31N 31W 35 DC	65.0	20.0	17.00
M:88596	31N 31W 35 DD	60.0	15.0	30.00
M:88595	31N 31W 35 DD	25.0	20.0	0.00
M:88602	31N 31W 36	105.0	30.0	80.00
M:88597	31N 31W 36	176.0	15.0	156.00
M:88598	31N 31W 36	101.0	6.0	20.00
M:88599	31N 31W 36 BAAA	28.0	45.0	16.00
M:88603	31N 31W 36 BB	115.0	20.0	86.00
M:88600	31N 31W 36 BB	240.0	8.0	220.00
M:88601	31N 31W 36 BB	96.0	10.0	80.00
M:88604	31N 31W 36 BBA	104.0	15.0	85.00
M:88605	31N 31W 36 BBB	108.0	15.0	82.00
M:88606	31N 31W 36 BBC	37.0	20.0	20.00
M:88607	31N 31W 36 BBD	99.0	12.0	83.00
M:88610	31N 31W 36 CD	80.0	10.0	60.00
88609	31N 31W 36 DA	279.0	10.0	265.00
8208	31N 30W 30	41.0	40.0	16.00
M:88209	31N 30W 30	43.0	30.0	17.00
M:88210	31N 30W 30 DB	35.0	30.0	20.00

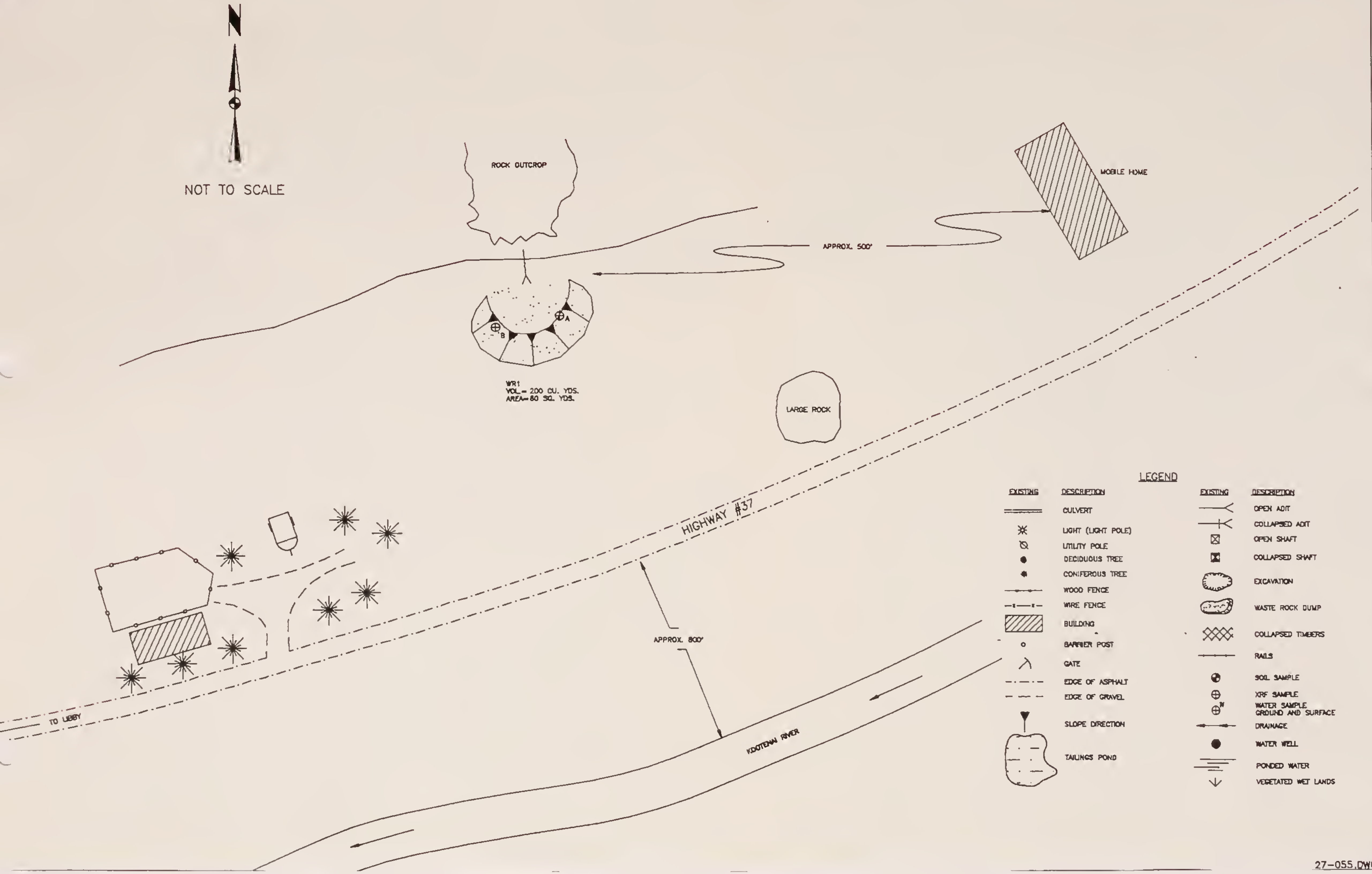


PIONEER
TECHNICAL SERVICES, INC.

MITCHELL CREEK, P.A. NO. 27-055

T31N, R31W, SECTION 25

SCALE: 1″ = 1000′



DRAWN JJP DATE 28 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER
TECHNICAL SERVICES INC. BUTTE, MT.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

MITCHELL CREEK PA# 27-055
LIBBY DISTRICT LINCOLN COUNTY

SHEET NO.

27-055.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Bullock, Flammang

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	200	East side of dump 2 feet from top	None	8.56 (S)	0.04	27-055-WR-1	08/04/93 2320	T-Metals, ABA
WR-1B	WR		West side of dump 2 feet from top	None	8.21 (S)	0.07			

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 27-055-WR-1 is composite of WR-1A and -1B.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:__________

Filled shafts: Yes___, No_X_, Number:____ Identification:__________

Seeps/Springs: Yes___, No_X_, Number:____ Identification:__________

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs:_770_

Distance to nearest well used for drinking?_Approx. 500 feet east upgradient_

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely_X__.
Mine is dry for the entire length; metal values in dumps are low.

Other observations/notes:_N/A_

GROUNDWATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X , Name(s):

Dry streambeds: Yes____, No X , Name(s):

Other surface water: Yes X , No_____, Name(s)/Description: The Kootenai River is 800 feet to the south.

Waste materials within any floodplain: Yes X , No___ Source ID(s): WR-1 is possibly in the 100 year floodplain.

Approximate Flood frequency?___1 yr,___10 yr, X 100 yr

Estimated seasonal flow of stream(s) (cfs)?
High Flow: 120,000 cfs , Average Flow: 12,000 cfs

Distance between waste source(s) and nearest surface water body (ft)? 800 feet to the Kootenai River to the south.

Surface water draining onto or through waste sources: Yes____, No X ,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Irrigation, stock watering, wetland, Kootenai Falls Park, fishery, recreation

Observed erosional/sedimentation/stream turbidity problems? Yes_____, No X , Distance downstream (ft)?_________ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SURFACE WATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approx. 0.5 acre between WR-1 and the highway.

Wetlands present: Yes___, No X , Describe:___

Carbonate rocks/soils: Yes___, No X , Describe:___

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000 X ; 3,000-10,000___; 10,000 or greater___; Comments___

Nearest residence(ft or miles)? 500 feet to the east

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, Flammang

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	None	Dry	720	680	Yes	Low, only if disturbed

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes X , No_____,
Describe: Corral and barn within 200 feet

Population within 1 mile: 1-10___; 10-30 X ; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments________

Evidence of recreational use on site: Yes___, No X , Describe:________

Accessibility - Fences, warning signs, closed roads? Unrestricted; parking on highway or private property

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No X , Comment________
Wilderness Area - Yes___, No X , Comment________
T&E Species Habitat - Yes X , No___, Comment Grizzly, Bald Eagle
Bat Habitat - Yes X , No___, Comment Bat guano in adit

Primary Drainage___; Secondary Drainage X ; No Information___:

Riparian Habitat Quality - High___, Medium X , Low___
Wetlands Frontage - High___, Medium X , Low___
Fisheries Habitat and Species Classification - 4
Sport Fishery Classification - 1

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X , No___, Number 1 , types and locations:
Adit #1 opening appears to be stable.

Hazardous structures: Yes___, No X , Number____, types and locations:________

Unstable highwalls, pits, trenches, slopes: Yes___, No X , Number____, types and locations:________

Unstable waste piles, impoundments, undercut banks: Yes____, No X , Number____, types and locations:________

Fire and/or Explosion hazards: Yes___, No X , Explain:________

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Mitchell Creek, Prepared by Northern Engineering and Testing, August 14, 1987.

USGS, Topographic Map, Vermiculite Mountain, Montana, 7 1/2 minute Quadrangle, 1983.

LABORATORY ANALYTICAL DATA

MITCHELL CREEK
PA NO. 27-055

MDSL AMRB/PIONEER 4/9/93

Mitchell Creek PA# 27−055
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER − BULLOCK
INVESTIGATION DATE: 08/04/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
27−055−WR−1	5.63 J	121	0.47 U	6.22	4.55	137	9140	0.026	509	11.8	10.5	5.64 U	30.1	NR
BACKGROUND	54.2 J	18.5	1.23	9.23	1.59 U	29.4	21400	0.060	475	11.8	198	7.15 U	213	NR

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
27−055−WR−1	0.01	0.31	3.82	3.51	0.01	<0.01	<0.01	0.00	3.82

LEGEND

WR1 − Composite of subsamples WR1A and 1B.
BACKGROUND − From the Snowshoe Mine (27−005−SS−1).

XRF ANALYSIS RESULTS

MITCHELL CREEK
PA NO. 27-055

MDSL AMRB/PIONEER 4/9/93

Mine Name: Mitchell Creek PA# 27-055
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
27-055-WR1-A		29225.1	2648.33	2963.15		965.367 *	16525.4	209.589 *	420.086	71.0539 *		67.7827
27-055-WR1-B		31433.5	2092.49	2930.78		876.033 *	17092.8		385.257	66.9998 *	36.1343 *	59.3044
27-055-WR-1-COMP		33612.1	2267.9	3191.9		1257.09	23536.7		164.427 *	85.767 *	25.3858 *	57.9941

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
27-055-WR1-A	306.605				192.728			649.488		14.5363 *	27.6103
27-055-WR1-B	304.285		5.70309 *		207.402			699.276		14.644	28.1017
27-055-WR-1-COMP	332.965				211.479			788.439			27.5627

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

MITCHELL CREEK
PA NO. 27-055

AIMSS SCORESHEET

SITE NAME: MITCHELL CREEK
PA NUMBER: 27-055

GROUNDWATER PATHWAY

LINE NO.				
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		2
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	40
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	40
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
6	GW - TARGETS	WELLS - 1 MI. x 2.5		277.5
7		WELLS - 1 TO 4 MI		659
8		NEAREST WELL		10
9		TARGETS SCORE	LINES 6 + 7 + 8	946.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	11

SURFACE WATER PATHWAY

11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	23
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	0

AIR PATHWAY

25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		10
26B		DISTANCE TO POPULATION		20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	200
27		LIKELIHOOD SCORE	LINES 25 + 26C	200
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
29	AIR - TARGETS	POPULATION - 4 MILES		1000
30		NEAREST RESIDENCE		10
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	1025
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	1

DIRECT CONTACT PATHWAY

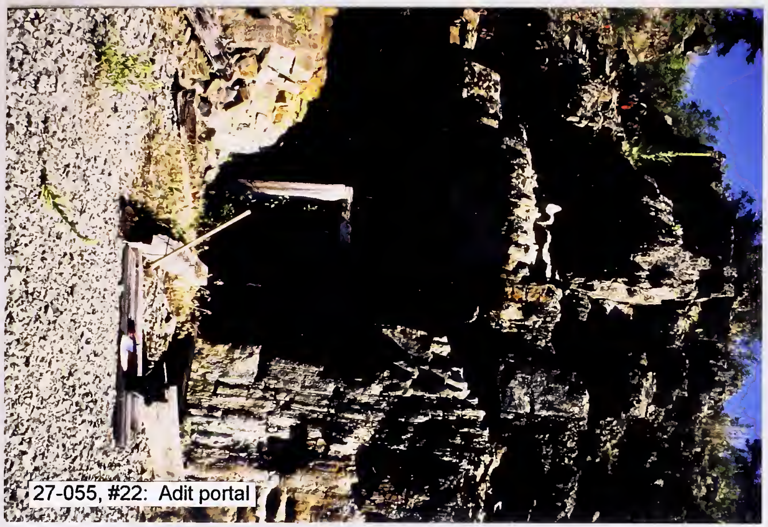
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		200
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	400
38		LIKELIHOOD SCORE	LINES 36 + 37C	600
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		10
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	20
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0

45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000	**0.00**

SITE NAME: MITCHELL CREEK
PA NUMBER: 27-055

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	50
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	20
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**20.00**



27-055, #22: Adit portal

27-055, #23: WR-1 and WR-1B sample locations

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: SILVER CABLE **PA#:** 27-066

Date: August 4, 1993 **Time:** 1000-2030
Date: September 7, 1993/Fly-over

Field Team Leader: Bullock, Pioneer

Sampling Personnel: Flammang, Pioneer
Clark, Pioneer

Visitors: None

Weather/Seasonality Observations: Calm; clear; warm (75°-80°F).

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): No photos or video were taken.

General Comments/Observations (not covered specifically in attached Inventory Forms):
08/04/93: Workings identified in Chen-Northern inventory could not be located by helicopter. MBMG and USBM reports described the mine approx. 900 feet higher in elevation than Chen-Northern described. Workings were located, but no samples were collected due to 100% vegetative cover and no pathways to surface water below. Two dumps located on the north side of drainage very high on the hill do not fit Chen-Northern inventory description.
09/07/93: Flew the Cable Creek drainage in the Cabnets to inspect the area and insure that no workings were overlooked during the initial investigation. The two additional openings discussed in the literature were located approx. 800 and 1,000 feet above the drainage bottom; one is an HMO. No disturbed ground or remnants of a mill on the valley floor could be identified. No dump material was in or near the drainage. This drainage does not match the description given on the inventory form, although little information was provided. It is possible that a different drainage was originally inspected.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: No action.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SILVER CABLE PA#: 27-066

Legal Description: T 28N ;R 31W ;Sec. 32 ,NW 1/4NW 1/4___1/4

County: LINCOLN Mining District: LIBBY

Latitude: N 48° 08' 42" Longitude: W 115° 37' 48"

Primary Drainage Basin and Code: Big Cherry Creek/17010101
Secondary Drainage Basin: Cable Creek

USGS Quadrangle map name(s): Snowshoe Peak

Mine Type/Commodities: Hardrock/Lead

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): Thomas A. Knowles et. al., Silver Cable Mining, 1001 4th Avenue Plaza, Suite 413, Seattle, WA 98154; Kootenai National Forest.

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 5500', Slope 35°,
Aspect North

Land use: Mining___, Recreational X , Residential___, Urban___,
Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? < 0.1 acres.
Dimensions:

Predominant vegetation types: Alder, Douglas fir, huckleberry, willow

Access: roads - good___,poor X ,4wd___,trail X .
Other logistical considerations (proximity to other sites). Trail is completely overgrown with alder. Road to bottom of Cable Creek drainage has a locked USFS gate at the bottom 2.4 miles from the base of the hill that the mine is located on.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Mine is located on the mountain side well above Cable Creek. The Snowshoe fault separates dark gray argillite and argillaceous quartzite of the Prichard Formation on the east from light-gray quartzite and quartzitic argillite of the Ravalli Formation on the west.

Mining/milling history, ore type/tenor, host rock, gangue: The mine was reported to be active during 1901 and 1902 and in 1905 and 1906, but no production is reported in literature. A 50-ton concentrator was constructed in the creek drainage, but never operated. Vein materials were reported to have contained quartz, pyrite, galena, and chalcopyrite. Dumps were probably disturbed during logging operations.

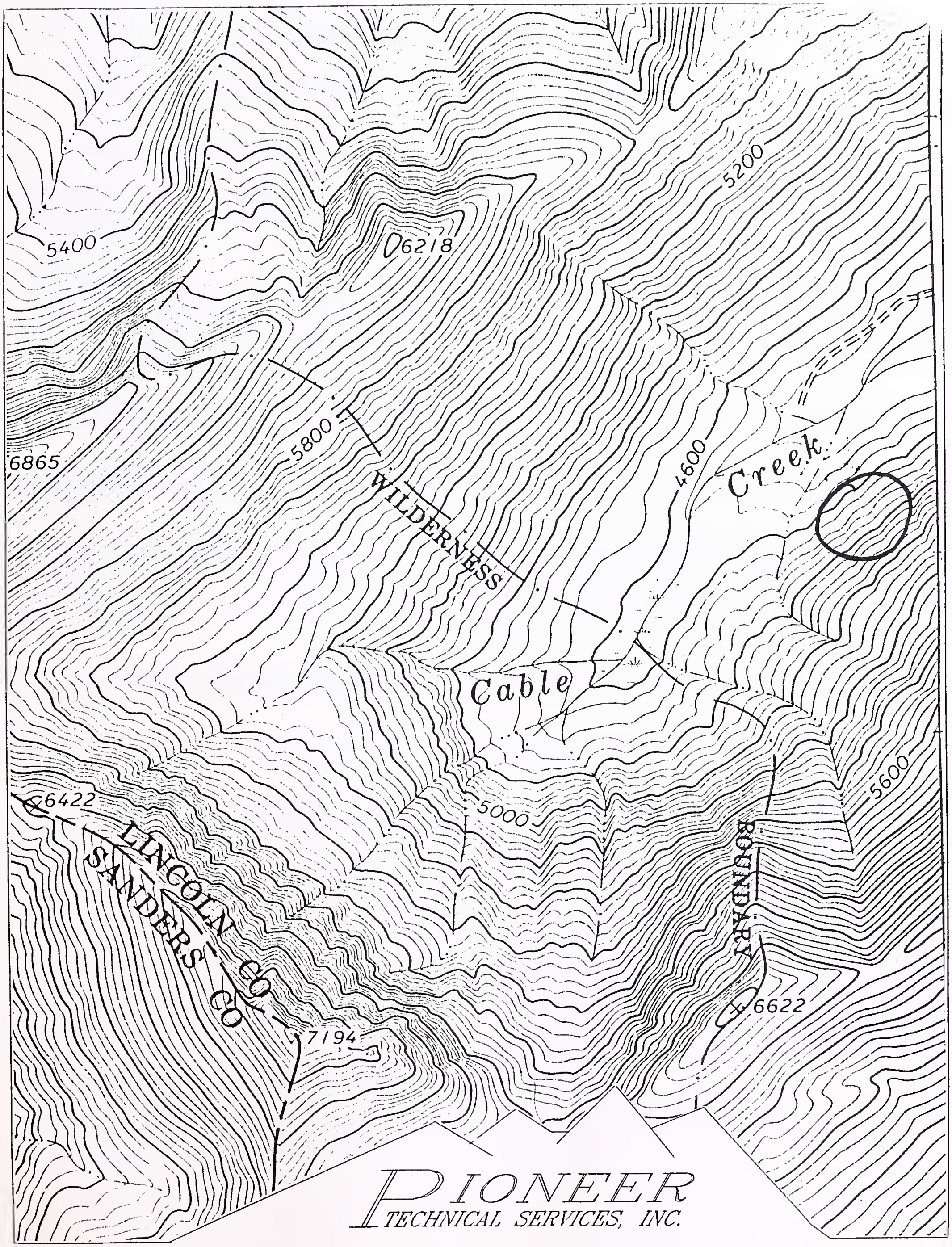
Mine Operation?
Shafts - Yes___, No X , # ____, Comment
Adits - Yes X , No___, # 4 , Comment 1 open
Pits - Yes___, No X , # ____, Comment
Placers - Yes___, No X , # ____, Comment
Other - Yes___, No X , # ____, Comment

Mill Operation? Yes___, No X . If yes answer the next three questions:

Period(s) of Operation: Mill constructed in early 1900s, but never operated.

Origin of Ore Milled - Custom Mill___ Dedicated Mill X ; Number and names of mines that supplied mill feed:

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? 50-ton concentrator; no process identified.



PIONEER
TECHNICAL SERVICES, INC.

SILVER CABLE, P.A. NO. 27-066

T28N, R31W, SECTION 32
SCALE: 1" = 1000'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution(approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable(based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment(Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS:

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)[*]	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.									

[*] D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: No samples were taken due to the inaccessibility of the workings (by foot or air) and the location of the workings well above the drainage.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X , Number:____ Identification:______

Filled shafts: Yes___, No X , Number:____ Identification:______

Seeps/Springs: Yes___, No X , Number:____ Identification:______

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 15

Distance to nearest well used for drinking? > 4 miles

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely X .
Shallow limited workings located high on hillside.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

____

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X , No___, Name(s): Cable Creek

Dry streambeds: Yes____, No X , Name(s):

Other surface water: Yes____, No X , Name(s)/Description:

Waste materials within any floodplain: Yes____, No X Source ID(s):

Approximate Flood frequency?___1 yr,___10 yr,___100 yr

Estimated seasonal flow of stream(s) (cfs)? N/A
High Flow:___________, Average Flow:___________

Distance between waste source(s) and nearest surface water body (ft)?
Approx. 800 feet

Surface water draining onto or through waste sources: Yes____, No X ,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Fishery, wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes_____, No X , Distance downstream (ft)?________ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):
N/A

SURFACE WATER INVENTORY FORM

SAMPLERS:

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): No samples taken due to lack of sources.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approx. 120 acres of broad valley bottom.

Wetlands present: Yes___, No_X_, Describe:______

Carbonate rocks/soils: Yes_X_, No_____, Describe: Reported in literature.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments None according to topographic map.

Nearest residence(ft or miles)? > 4 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: ______

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
No samples were taken.						

Notes and Clarifications: No sources

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X , Describe:________

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments None

Evidence of recreational use on site: Yes___, No X , Describe:________

Accessibility - Fences, warning signs, closed roads? Forest Service gate

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No X , Comment________
Wilderness Area - Yes___, No X , Comment________
T&E Species Habitat - Yes X , No___, Comment Grizzly
Bat Habitat - Yes X , No___, Comment Possible

Primary Drainage___; Secondary Drainage X ; No Information___:

Riparian Habitat Quality - High___, Medium X , Low___
Wetlands Frontage - High___, Medium X , Low___
Fisheries Habitat and Species Classification - 4
Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X , No___, Number 1 , types and locations: Adit on hillside

Hazardous structures: Yes___, No X , Number____, types and locations:________

Unstable highwalls, pits, trenches, slopes: Yes___, No X , Number____, types and locations:________

Unstable waste piles, impoundments, undercut banks: Yes____, No X , Number____, types and locations:________

Fire and/or Explosion hazards: Yes___, No X , Explain:________

Bibliography

MBMG, Geology and Mineral Deposits of Lincoln and Flathead Counties, Montana, Bulletin 79, Written by W.M. Johns, 1970.

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ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

SILVER CABLE
PA NO. 27-066

AIMSS SCORESHEET

SITE NAME: SILVER CABLE
PA NUMBER: 27-066

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		2
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	40
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	40
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		15
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	15.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	0
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		0
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	21
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	0
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		1
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	5
27		LIKELIHOOD SCORE	LINES 25 + 26C	5
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
29	AIR - TARGETS	POPULATION - 4 MILES		0
30		NEAREST RESIDENCE		0
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	15
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	0
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37A		ACCESSIBILITY		10
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	50
38		LIKELIHOOD SCORE	LINES 36 + 37C	50
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		0
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	0
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		0.00

		SITE NAME:	SILVER CABLE
		PA NUMBER:	27-066

LINE NO.		SITE SAFETY		
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	50
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	0
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	0.00